32054

National Library of Canada
Bibliothèque nationale du Canada

CANADIAN THESES ON MICROFICHE

THÈSES CANADIENNES SUR MICROFICHE

NAME OF AUTHOR/*NOM DE L'AUTEUR* JAMES RAYMOND REID

TITLE OF THESIS/*TITRE DE LA THÈSE* ON THE SEMANTIC IMPLICATIONS OF VOICE SYNTAX IN ENGLISH

UNIVERSITY/*UNIVERSITÉ* UNIVERSITY OF ALBERTA

DEGREE FOR WHICH THESIS WAS PRESENTED/ *GRADE POUR LEQUEL CETTE THÈSE FUT PRÉSENTÉE* Ph. D.

YEAR THIS DEGREE CONFERRED/*ANNÉE D'OBTENTION DE CE GRADE* 1977

NAME OF SUPERVISOR/*NOM DU DIRECTEUR DE THÈSE* WM. J. BAKER

Permission is hereby granted to the NATIONAL LIBRARY OF CANADA to microfilm this thesis and to lend or sell copies of the film.

The author reserves other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

L'autorisation est, par la présente, accordée à la BIBLIOTHÈQUE NATIONALE DU CANADA de microfilmer cette thèse et de prêter ou de vendre des exemplaires du film.

L'auteur se réserve les autres droits de publication; ni la thèse ni de longs extraits de celle-ci ne doivent être imprimés ou autrement reproduits sans l'autorisation écrite de l'auteur.

DATED/*DATÉ* April 1st 1977 SIGNED/*SIGNÉ* J Raymond Reid

PERMANENT ADDRESS/*RÉSIDENCE FIXE*
68 COLTER CR. NW
MEDICINE HAT ALBERTA
T1A7B2

NL-91 (3-74)

National Library of Canada

Cataloguing Branch
Canadian Theses Division

Ottawa, Canada
K1A 0N4

NOTICE

The quality of this microfiche is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us a poor photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this film is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30. Please read the authorization forms which accompany this thesis.

THIS DISSERTATION
HAS BEEN MICROFILMED
EXACTLY AS RECEIVED

Bibliothèque nationale du Canada

Direction du catalogage
Division des thèses canadiennes

AVIS

La qualité de cette microfiche dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de mauvaise qualité.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, examens publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de ce microfilm est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30. Veuillez prendre connaissance des formules d'autorisation qui accompagnent cette thèse.

LA THÈSE A ÉTÉ
MICROFILMÉE TELLE QUE
NOUS L'AVONS REÇUE

NL-339 (3/77)

THE UNIVERSITY OF ALBERTA

ON THE
SEMANTIC IMPLICATIONS OF VOICE SYNTAX
IN ENGLISH

by

ⓒ JAMES RAYMOND REID

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE
OF DOCTOR OF PHILOSOPHY
IN
PSYCHOLINGUISTICS

DEPARTMENT OF LINGUISTICS

EDMONTON, ALBERTA
SPRING, 1977

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "On the Semantic Implications of Voice Syntax in English" submitted by James Raymond Reid in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Psycholinguistics.

Wm J. Baker
Supervisor

Gary D. Prideaux

Lois Marckworth

Wm W. Rozeboom

External Examiner

Date: 28 April 1976

ABSTRACT

This study is an attempt to elucidate some of the aspects of constructional meaning associated with grammatical voice in English. Experimental findings are presented, which indicate the relative meaningfulness, to ordinary literate speakers, of the preverbal, intraverbal, and postverbal components of voice syntax, and the cognitive interactions among them. From these data, it is inferred that the active-passive alternation is not a unitary phenomenon, psycholinguistically, and that the linguistic competence underlying the use of grammatical voice is more realistically modeled by a surface-structure paradigm than by abstract rules for permuting constituents.

The origins and development of the active-passive inversion rule are described, from traditional accounts of voice meaning and syntax to recent formulations by Chomsky and others. The fundamental importance of the rule in generative-transformational theory is emphasized, and its inadequacy, even as a purely descriptive measure, is discussed. The experimental literature relating to the use of grammatical voice is reviewed: the relevant studies, representing a variety of points of view and often involving voice only tangentially, are seen to be largely inconclusive.

Two new experiments are reported. In the first, undergraduate volunteers learned to distinguish sentences which varied systematically as to the presence or absence of the perfective have...-ed and passive be...-ed auxiliaries in the verb phrase, as well as having by-phrases alternating with other constituents in the postverbal adjunct position. Intraverbal factors were more salient than postverbal, reflecting the optionality of agentive by-phrases in English passive locutions. A strong interaction between voice morphology and perfective aspect within the verb phrase was interpreted as evidence of the syntactosemantic ambiguity of those formally similar elements.

In the second experiment, subjects were required to categorize, in hierarchical fashion, 120 different predicative statements having either a nominal, an adjectival, or a past-participial adjunct in the postcopular position. Although the subject group as a whole clearly separated agentive passive predications from non-passive, agentful agentives from agentless, and nominal complements from attributive, their over-riding concern was with singularity vs. plurality in the subject NP. The informants, furthermore, were by no means unanimous in their bases for distinguishing sentences; together with their further preoccupation with animateness and definiteness in subject nominals, this suggests that passive predications are not quite the same kind of message as be -- Complement sentences, but at the same time that they are not so markedly different from them as to constitute an inverted or otherwise 'derived' locution type.

ACKNOWLEDGMENTS

First among the Bills to be paid is Professor Wm. J. Baker, my chief mentor these past several years: this thesis was inspired by a wish he once expressed, that someone ought to write the definitive book on voice. If I have succeeded in even partly fulfilling that wish, I owe it all to his guidance and encouragement. I am also grateful to Drs. Gary D. Prideaux and Mary Lois Marckworth for their invaluable criticisms and many helpful suggestions, and to Drs. Wm. W. Rozeboom and Wm. C. Watt for perspicuous service as extradepartmental examiners.

As a visiting and sessional lecturer at the University of Victoria, I profited greatly from Jim Arthurs' benevolent skepticism, and from Henry Warkentyne's patient affability. Thanks also to Harry Osser, whose collaboration made the psycholinguistics course a success.

To my wife Lorraine, without whose patience and support this work would not have been at all possible, I owe more than I can ever repay. This thesis is dedicated to her, and to our children Monica and Iain.

My years of doctoral study in Edmonton and Victoria were made easier by University of Alberta graduate teaching assistantships and by Canada Council doctoral fellowships. I am also indebted to the University of Victoria for the use of many facilities, especially the ATS and SCRIPT text-formatting systems provided by U Vic Computing Services.

TABLE OF CONTENTS

CHAPTER ONE: INTRODUCTION 1

CHAPTER TWO: GRAMMATICAL ACCOUNTS OF VOICE 13

Pre-structuralist Traditions 13

Historical Perspective 13

Graeco-Latin Origins 15

The Renaissance and After 18

The Scholarly Grammars 21

Structuralist Descriptions 26

Early American Formalism 26

Post-Bloomfieldian Taxonomics 30

Early Transformationalism 38

Aspects and Later Formulations 50

Case Grammar 79

CHAPTER THREE: EMPIRICAL INVESTIGATIONS OF VOICE 85

Svartvik's Taxonomy 86

Psycholinguistic Experiments 103

Sentence-Type Complexity 108

Context of Use 145

Intrasentential Relations 152

CHAPTER FOUR: TWO FURTHER EXPERIMENTS ON VOICE 161

Serial Elaboration in Sentence Processing 161

A Transformationless View of Passives 164

The Independence Hypothesis 168

Experiment 1 171

Introduction 171

Method 177
Results 181
Discussion 189
Experiment 2 197
Introduction 197
Method 203
Results 214
Discussion 222
CHAPTER FIVE: GENERAL DISCUSSION AND SUMMARY 231
On the Empirical Status of Grammatical Voice 231
On the Superfluity of the Passive Transformation 236
A Viable Competence Grammar 246
Conclusion 255
Summary 256

REFERENCES 265
APPENDIX A: The Experiment 1 Stimulus Sentences 282
APPENDIX B: Experiment 1 Instructions to Subjects 286
APPENDIX C: The Experiment 2 Stimulus Sentences 289
APPENDIX D: Experiment 2 Instructions to Subjects 293
APPENDIX E: Hierarchical Cluster Analysis of Experiment 2 Data, Diameter Method 297
APPENDIX F: Hierarchical Cluster Analysis of Experiment 2 Data, Connectedness Method 301

LIST OF TABLES

Table 1. Analysis of Variance: Yes Responses as a Function of Sex, Target-type Feature, and Yes-error Type, Experiment 1. 182

Table 2. Mean Last-Error-Trial Percentages for each Target Syntactic Feature, as a Function of Assigned Target Sentence Type, Experiment 1. 186

Table 3. Principal Groupings of Experiment 1 Subjects Resulting from Hierarchical Cluster Analysis of their Yes-response Patterns, also showing Last-error Trial (LET) Percentages 187

Table 4. Use of Various Sentence-sorting Criteria at Four Possible Stages of Sorting by 60 Subjects, Experiment 2. 220

LIST OF FIGURES

Figure 1. Mean Percent Yes Responses as a Function of Target Tense/Perfectiveness (TPV), Target Voice (VCE), and Correctness of Response, Experiment 1. 183

Figure 2. Hypothetical Hierarchical Sort of 25 Objects, and the Associated Similarity Matrix, Illustrating the Primary Scoring Method Applied to Experiment 2 Sentence Sorts. 212

Figure 3. Summary of Johnson 'Diameter' Method Hierarchical Cluster Analysis of Experiment 2 Data. 216

> Word order is unquestionably an abstract entity, but it owes its existence solely to the concrete units that contain it and that flow in a single dimension. To think that there is an incorporeal syntax outside material units distributed in space would be a mistake.
>
> - F. de Saussure -

CHAPTER ONE

INTRODUCTION

Grammarians' views on the nature of grammatical voice have varied considerably, over the years. One of the more skeptical opinions was expressed by R. B. McKerrow in 1922:

> If we were now starting for the first time to construct a grammar of modern English, without knowledge of or reference to the classics, it might never occur to us to postulate a passive voice at all. It seems to me that it is questionable whether in spoken English of to-day there is really any such thing, and though, as a matter of convenience, it may be well to retain it in our grammars, I doubt whether it ought to occupy quite so prominent a position as it sometimes does. (p. 163)

In his comprehensive study _On Voice in the English Verb_ (1966), Jan Svartvik echoed McKerrow's plea, and adduced some persuasive empirical evidence in its support: the most commonly occurring 'passive' locutions, he found, differed negligibly from predicative uses of 'be' and bore little relation to any active transitive clause. Svartvik's approach, to be sure, was an open-minded one: his working definition of a 'passive' construction was purely formal, much more inclusive than either then current taxonomic descriptions or generative-transformational analyses, and it netted him a wide-ranging corpus of '_be_ -- _V+ed_' constructions and their co-occurrents. Since the goal of the enterprise was to arrive at a taxonomy of the lexico-syntactic signals of voice and their semantic correlates, formal and distributional criteria dominated the typological and quantitative analyses. Inferences therefrom, however, relied heavily on analytic intuition, with little or no attempt made to justify those philosophical presuppositions which all linguists seem to share.

The approach taken here is also that of the 'fishing expedition,' but from a rather different point of view. The intention is not to propose yet another linguistic description -- taxonomic, generative, or otherwise -- of voice syntax in English, but in a sense to try to obtain empirical justification for that which Svartvik and a host of others have taken quite for granted, i.e., to determine whether the grammatical concept of voice has any functional reality to speakers as a psycholinguistic phenomenon. In light of Svartvik's taxonomic findings it must be asked, indeed, whether there is such a single unified phenomenon as voice alternation in the traditional sense, and whether it is not better regarded as the confluence of two or three somewhat disparate syntactosemantic events. The question is not how active and passive constructions may best be correlated in a grammar, but rather, how speakers compose and understand sentences, and whether they conceive of actives and passives as correlated at all. Various linguistic descriptions are examined, as potential sources of hypotheses about the voice aspect of verbal competence, but the main purpose of this study is to assess ordinary literate speakers' behavioral interpretations of active and passive forms. The conclusions reached are thus based on replicable empirical observation, and they raise some rather important questions about the adequacy of current competence theories.

For generations, grammatical descriptions of English voice syntax have been based on the highly systematic structural relations inferrable between active and passive transitive sentences with overt agents, and the illocutionary correlates of these formal mappings. The transformational formulation of these regularities constitutes a virtual *sine qua non* of current linguistic theory, occupying a prominent and early place in every generative grammar textbook. Passiveness, Chomsky has argued, is more than a mere aspectual feature of the verb: its co-occurrence restrictions are such as cannot be stated simply, in a one-level descriptive system; hence, transformations are *required* in grammars, in order to explain how alternative locutions are related through a common core of meaning. And this, it is further claimed, models the "mental reality underlying actual behavior," known to and used by every mature speaker of the language (Chomsky, 1957, pp. 42ff.; 1965, *passim*; 1966a; 1968).

Experiments on the cognitive implications of syntactic variation have yielded equivocal results for the generative-transformational performance hypothesis in general, and for the active-passive relation in particular (Watt, 1970; Greene, 1972). Few adult speakers are ever actually aware of voice in sentences; most must be taught it fairly carefully, for sentence-transforming experiments. Subjects usually find the active-passive distinction different in kind from other syntactosemantic aspects of sentences such as mood and modality, and some speakers fail altogether to distinguish passive sentences from their active counterparts (Baker & Prideaux, 1975; Baker, Prideaux, & Derwing, 1973; Reid, 1972, 1974b). Generative-transformational theory, however, denies any accountability to such performative facts, for it purports to represent just the unconscious knowledge of the 'ideal' speaker-hearer, and then only in the most abstract and descriptively parsimonious fashion. Transformationalism entertains no hypotheses except how intuitively correct structural descriptions may most elegantly be generated, yet it ascribes performative relevance to its circularly predictive grammars as if whole populations had contributed to a language-use investigation. What competence seems to amount to, in the Chomskyan view, is a codification of those aspects of the human faculté de langage which are amenable to systematic description; as such, it is a theory that cannot claim any psychological reality worth mentioning (Feltkamp, 1971; Reid, forthcoming [a]; Stuart, 1969).

What is needed in psycholinguistics is a more realistic account of the knowledge which governs linguistic behavior.

Introspective analyses within the generative-transformational framework have provided multiple hierarchies of formal inclusion relationships as candidates for cognitive facthood: the extent to which these relationships hold, however, is a matter for empirical investigation, not rational deliberation, for no hypothesis was ever publicly confirmed in a Gedankenexperiment. Researchers now have some idea of the hierarchical dominance relationships which generally obtain among the basic illocutionary features of utterances: those syntactosemantic alternatives traditionally regarded as having the 'same' meaning -- and, hence, accounted for grammatically by optional 'non-meaning-changing' transformations -- are usually low in apperceptual salience, relative to 'meaningfully different' oppositions (Prideaux & Baker, 1974; Reid, forthcoming [b]). Such findings may not be unequivocally attributed simply to constructional meaning-equivalence, nor even to syntactosemantic confusion; there is always the possibility, in form-oriented differentiation tasks, that no difference in form is perceived, as well. Other relations among superficially similar sentences, in other words, may be far more cogent to ordinary language use than the analytically subtle transformational regularities.

Svartvik found, for example, that agentless be -- V+ed clauses by far outnumbered 'agentful' (1966, p. 141), and that they did not, in every case, have a viable active transitive counterpart. They did, however, have 'paradigmatically' related paraphrases, which led Svartvik to conclude that "as we proceed down the passive scale, in the direction away from the agentful classes, it becomes increasingly realistic, and economical, to consider the production of passive sentences in terms of serial relationship with equative and intransitive active clause types" (p. 166). Watt (1970, 1974) has suggested, furthermore, that agentless passive expressions are initially learned as instances of the Noun--be--Adj kernel sentence type (Harris, 1957), and can find no reason to believe that speakers later abandon this simple paradigmatic view of be predication in order to produce one of its familiar subtypes as truncates of full passives. The empirical evidence is only suggestive, but it may not be too far-fetched to suppose that 'full' passives, contrary to generations of analytic dogma, may as easily function in language use as extensions of the so-called 'truncates' as the reverse (Svartvik, 1966, p. 134).

If ordinary English speakers could be shown to treat active sentences and their passive counterparts as members of the same message-type paradigm, rather than different ones, this would constitute evidence for the primacy of left-to-right hierarchical composition over transformational generation as the cognitive basis of grammatical voice use. Deep structure would then stand revealed as an artifactual level of analysis, necessitated by adherence to sets of "ordered sentence-enumerating rules" (Lees, 1964) as descriptive systems. Not that the transformational relation as an analytical notion is to be totally denied: it can, undoubtedly, be pointed out to many native speakers. Recent experiments have shown, however, that even the explicit transforming of given sentences is more adequately described by a surface-to-surface 'performative efficiency' model than by any extant 'recovery of deep structure' scheme (Baker & Prideaux, 1975). A viable "speaker-hearer grammar" will thus probably share many of the features of systematic linguistic descriptions, but where the latter seek to expose "the whole system of a language" in terms of "the maximum depth of analysis attainable by a rather subtle native speaker," the former must deal with the human mind as a "*memory-equipped* device," and may incorporate algorithmic procedures reflecting some inelegant but effective "mnemotechnical" shortcuts (Feltkamp, 1971, p. 235ff.).

While the present work seeks ultimately to make a contribution toward a behaviorally-constrained theory of linguistic competence, its immediate goal is a more modest one: to discover what correlations exist between linguists' conceptions of voice and ordinary speakers' notions thereof. The 'marked' member of the voice opposition is usually characterized in terms of one or more of its three main facets:

1. a 'victim-event' relationship (Joos, 1964) between the referents of the preverbal (subject) NP and the verb;

2. the overt presence of be...-ed in the verb phrase, and its resultant aspectual meaning;
3. expressed, or at least implied, agency, in an optional postverbal by-phrase adjunct.

The extent to which these features are claimed to interact semantically varies from theorist to theorist, and largely determines what is or is not to be considered an instance of the passive. One thus reads of passive subjects, passive verbs, passive constructions, passive sentences, and so on, but nearly always in terms of what they are *not*, i.e., active. The Saussurean principle of analysis only in terms of functional contrasts has been such a pervasive tool in 20th century linguistics that few, if any, attempts have been made to discover what voice *is*, to the average speaker.

Underlying most linguistic and psycholinguistic theorizing about voice is the usually unspoken assumption that active and passive sentences are patently different. The goal of the theorizing is then to describe the structural and semantic correspondences between these sentence types, on the one hand, and the psychological correlates of those abstract relations, on the other. The passive transformation, in other words, is taken to be a cognitive fact, and research is conducted in order to explain its mental utility as a mediator between sound and meaning. What if the assumption were wrong? Aside from the well-documented fallacy of making psychological inferences from grammars that 'work' (Stuart, 1969; Derwing, 1973;

Botha, 1970, 1973), there are experimental findings which suggest that actives and passives are differentiable, but by no means obviously so (see above); how then can linguists continue to theorize as if their assumption were a well-known _fact_? To clarify the active-passive difference on the basis of empirical observation, however, is epistemologically awkward: the scientist cannot, as a matter of principle, vindicate the Null Hypothesis; he can only offer evidence _against_ it, with an associated probability of being correct -- or wrong. The belief that two things are not significantly different can thus never be established; it is the _faute d'autre_ explanation which remains after every attempt to demonstrate a significant difference has failed, and one can never be certain that enough counterhypotheses have been tested. There is no one experiment, in short, which will confirm or deny the psychological necessity of the passive transformation, and an empirical approach to the matter cannot be other than piecemeal.

It has been claimed (Chomsky, 1970, 1972) that the three characteristics of passive locution (see above) have a certain amount of independence. The only one unequivocally associated with passiveness would seem to be the agentive _by_-phrase, for 'victim' subjects and _be_ -- _V+ed_ constructions occur in sentences which are frequently not analyzed as passive, such as 'The whole house shook' or 'John was excited at the prospect,' respectively. And yet, explicit agency would appear to be quite redundant, since agentless passives are far more common than agentful, and indeed, passive intent can be communicated with neither agency nor passive verbal aspect expressed (Lyons, 1968, pp. 376ff.; Svartvik, 1966). Besides these distributional facts, the very lack of agreement among theorists as to which is the cardinal feature of the three leads one to question the unitary nature of the phenomenon. If behavioral evidence could be found to support one viewpoint or another, linguistics as a science would be that much closer to justifying its fundamental assumptions and defining, on a truly empirical basis, what passiveness really consists of. And if such evidence, furthermore, could show that elusive concept to be more readily communicable in superficially similar but transformationally divergent sentences than the reverse, that would lend more weight to the "executive efficiency" hypothesis (Watt, 1974).

The overall aim of this study, therefore, was to investigate the psychological correlates of the formal active-passive relation, and the extent to which these play a part in ordinary language use. The first experiment, designed to assess the cognitive autonomy of the three principal components of voice syntax, showed that the verbal aspect component of sentences has communicative reality which is independent of postverbally adjoined information, and carries much the greater voice-signalling burden; the active-passive relation would thus seem to encompass psychologically discernible form-meaning associations which sometimes coincide in sentences, and sometimes do not. The passive transformation, which formally incorporates all these components, thus accounts for -- and thereby labels as 'passive' -- only those sentences in which all three are operative, and hence fails both as the formalization of some aspect of human linguistic competence, and as the keystone element of grammars purporting to enumerate all the major sentence types of English. A second experiment, which sought to establish the place of passives in the hierarchy of be predication, found them to be communicatively in a class apart from traditional complement constructions (i.e., be -- ADJ; be -- NP); but the fact that singularity vs. plurality in sentence subjects had far greater salience as a message-type-distinguishing feature suggests that passive predications are not altogether unrelated to attributive statements, for the formal and semantic characteristics of sentence subjects were considered at least as important as those predicate features which distinguished clause types.

In addition to detailed expositions of completed original experiments, the remaining chapters of this thesis comprise the rationale therefor, in the form of amplified treatments of the ideas and arguments thus far presented only sketchily. Linguists' accounts of passive voice are reviewed, from the pre-structuralist traditions to the most recent generative-transformational proposals, with one thread, the notion that passives are derived from actives, connecting them all. The relevant antecedent experimental research is surveyed, most of it dealing with voice only tangentially (that alone necessitating a more comprehensive study), and past findings are combed for loose ends in need of tying up. A general hypothesis of independent first-to-last processing for active and passive sentences -- based on independent suggestions by Svartvik (1966), Watt (1970, 1974), and others -- is developed, as a more plausible alternative to anything inferrable from current competence theory, and subjected to empirical testing. The experimental results that were obtained are not likely to shake the foundations of transformationalism, but they should at least add one more voice to the growing chorus of protest against 'fly-bottle' scientism in linguistics (Prideaux, 1971).

CHAPTER TWO

GRAMMATICAL ACCOUNTS OF VOICE

Pre-structuralist Traditions

Historical Perspective

When grammatical transformations, as formulated by Chomsky, appeared in print in 1957, they were hailed -- and condemned -- as a revolutionary new idea. And yet basically they were not new at all, for the notion that certain classes of sentences are systematically related in form and meaning had been grammatical doctrine for generations. What was new was the degree to which formal syntactic relations were made explicit and general, at the expense of semantic relations -- which were virtually ignored -- and the questionable uses to which transformations were being put, as part of an abstract generative machine for language description (Reid, forthcoming [a]).

Of all the inter-sentence-type transformational relations, the active-passive surely has the longest tradition. With its roots in Graeco-Roman antiquity, the grammatical dichotomy now known as voice survived for centuries in western European grammars, both those of Latin and Greek and those of the vernaculars. The classical tradition, as Michael (1970) has shown, has been immense, authoritative, and almost inescapable; McKerrow's objective detachment from the tyranny of the past (cited above, p. 1) has not had many co-adherents, even among the avowedly scientific mid-20th century structuralists.

From earliest times, activeness and passiveness have been defined in tandem, with the at least implicit suggestion that the one is an alternate form of, and derivable from, the other. The positive attributes of passive constructions have from time to time been mentioned, but the historical trend has been to treat passives as something marked or extraordinary, a perversion of the 'natural' and 'logical' order. Passives have thus generally gotten short shrift in grammatical descriptions, compared to actives. In this broad relational sense, there has always been a passive 'transformation,' at least _in ovo_; its disparate syntactic and semantic aspects only needed to be rigorously formalized.

The most noticeable feature of grammatical accounts of voice through the ages, as even a cursory examination of the tradition will show, has been inconsistency. The origin of the term 'voice' itself, as a grammatical category, is difficult to determine, for Roman and mediaeval Latin grammarians rendered the ancient Greek concept of _diathesis_ variously as _genus_, _species_, _significatio_, or _adfectus_, and reserved the use of _vox_ for the relatively uninteresting 'articulate sounds' conventionally associated with words

(Lyons, 1968, pp. 371-2; Michael, 1970, pp. 45-6, 113-4). But more than that, there has been, besides the usual confusion among formal, semantic, and syntactic criteria so characteristic of pre-structuralist grammars, a great divergence of opinion among grammarians as to exactly what it is that can be either active or passive: nouns, verbs, verb phrases, predicate phrases, verb adjuncts, clauses, or whole sentences.

Graeco-Latin Origins

Dionysius Thrax, in the second century B.C., classified both nouns and verbs on the basis of *diathesis* ('disposition'), ascribing *energeia* to words denoting 'actors' and 'acting' (e.g., *krites* 'the one judging'; *typto* 'I strike'), and *pathos* to 'receivers' and the 'receiving' of action (e.g., *kritos* 'the one being judged'; *typtomai* 'I am struck'). His verb examples illustrated the high degree of morphological inter-relatedness which generally obtained between the voice alternants of verbs in Greek, but his noun examples were misleading. Related noun pairs such as *krites*-*kritos* were somewhat exceptional, and more a matter of historical accident than paradigmatic alternation; the existence of active and passive participles (e.g., *krinon* 'the one judging'; *krinomenos* 'the one being judged') occurring freely as nominals made 'active-passive' noun pairs somewhat superfluous, and probably inhibited their historical formation, as well. Being thus of such limited applicability, the notion of voice as a noun accident gained little or no acceptance (Michael, 1970, pp. 113-4).

Although _diathesis_ ostensibly had to do with the forms a verb can take, and their associated meanings, the concept served primarily as a classificatory criterion for distinguishing what were persistently thought of as different _kinds_ of verbs. Conceptual distinctions, as between accidence and typology, or among form, meaning, and syntax, were definitionally noted, but seldom adhered to; the inevitable result was a confounding of voice, transitivity, and ergativity which persists to the present time (Lyons, 1968, pp. 350-88). The existence of Greek verb inflections which were passive in form but active in meaning (e.g., _louomai_ [_khitona_] 'I am washing myself [a shirt]') constituted a third 'middle' voice to some grammarians, but this only added to the confusion.

Latin grammars were largely modeled on that of Dionysius for Greek, and they preserved his _energetikos_-_pathetikos_ dichotomy. In his _Ars Grammatica_ of the fourth century A.D., Aelius Donatus gave an unusually formal definition of the voice alternants, and explicitly, though not exhaustively, pointed out their inter-derivability:

> Activa sunt quae o littera terminantur et accepta r littera faciunt ex se passiva . . . passiva sunt quae r littera terminantur et ea amissa redeunt in activa. (cf. Michael, 1970, p. 94).*

---

* 'Active [verbs] are such as are terminated by the letter _o_, and upon addition of the letter _r_, become passive . . . passives are such as are terminated by the letter _r_, and

Verbs corresponding to Greek 'middle' verbs (i.e., passive in form but active in meaning) were classed as *deponent*, and the ancient Stoic 'neutral' verb category was revived to account for verbs which were neither active nor passive; this turned out to be a mixed bag, comprising copulatives, intransitives, and a number of other types.

Mediaeval Latin grammars were by and large slavish imitations of Donatus or Priscian (5th century), and did little to improve the confused *status quo*. Aelfric's tenth-century work in English, however, was an exception: his analysis of Latin voice was idiosyncratic, but his explications afford some interesting insights into the use of voice in late Old English. Aelfric maintained the old *actio vel passio* distinction in verbs (*weorc oththe throwung*), but replaced Donatus' *neutrum* category with *gethafung* ('assent'), as in *amor*: *ic eom gelufod* ('I am loved'). Although a distinction was apparently being claimed between the latter 'stative' predication and 'true' passives such as *verberor*: *ic eom beswungen* ('I am beaten'), there was no formal basis for such a claim in Latin, and it may have been semantically groundless as well. There may well have been such a distinction in English, but Aelfric's use of the copulative *eom* in both expressions -- adumbrating modern usage -- was somewhat misleading: the use of *weorthan* in at least the 'true' passive, like the use of

---

upon its removal revert to actives.'

werden in modern German, would have been more consistent with tradition and Aelfric's own previous usage, even though the distinctive passive auxiliary was at the time losing its currency (Frary, 1929, p. 11; Michael, 1970, p. 57).

The Renaissance and After

Despite Aelfric's novel approach, 'being, doing, and suffering' continued to be the chief criteria for verb classification well into the 18th century. During the Renaissance, the term 'grammar' ceased to be associated exclusively with prescriptions for writing Latin and Greek correctly, and gradually -- even grudgingly -- came to be linked with 'the vulgar tongues of Europe.' The ancient modes of analysis nevertheless continued to exert a powerful influence, and the vernaculars, insofar as they lacked certain categories or distinctions regarded as universal, were branded as syntactically deficient. This, however, was a blessing in disguise, for many grammarians thereby came to realize that there is no such thing as a passive verb per se, in English: that typological category aptly accommodated distinctive inflected forms such as amor, but the minimal English equivalent 'am loved' could hardly be called a verb, comprising as it did what were for independent reasons regarded as a verb and a participle. Each word in an utterance belonged to one part of speech or another, it was firmly believed, and inflection was the means by which different relations among words were properly expressed.

Some Renaissance grammarians took the facts of English well in stride: Ben Jonson's 1640 grammar, for example, defined a verb as active if there existed a 'passive participle' form of it which could occur with be. The old philosophical argument that the doing of a transitive action necessarily implied its being 'suffered' by its object had more far-reaching effects in 18th century England than it had had among the Latinists, for once it was fully realized that passiveness in either case involved accidence, i.e., the inflection of a basic verb form, and not a different kind of verb, a resolution of the old active/passive/neuter vs. transitive/intransitive paradox was possible. The whole matter was authoritatively settled in the first edition of Encyclopaedia Britannica, 1771, p. 738:

> Verbs . . . might with more propriety be divided into two classes, . . . transitive and not transitive; the first class including all those verbs which are usually called active, with the passive belonging to them; for it is evident, that these passives are not verbs themselves, but a variation only of a verb. (cf. Michael, 1970, p. 377)

One of the earliest explicit uses of the term 'voice' in its modern relational sense appeared in Ward's Essay on Grammar, 1765. Just as there are verbs in the active voice which imply no action -- e.g., 'resemble' -- there are verbs in the passive voice, he pointed out, that imply no 'suffering:' e.g., 'to be lost.' Still, there is a reciprocal and complementary relationship between the participants in an event, such that 'John holding James' and

'James held by John' can describe the same picture; the viewer is at liberty to consider either John or James as "the capital object in the appearance" (Michael, 1970, p. 378). This view foreshadows the present-day quandary about the interplay of syntax, semantics, and pragmatics associated with voice.

Relatively few English grammarians of the 18th century were able to escape the tyranny of the word, but occasional mention is found of voice as a phenomenon with sentence-wide implications. It had long been accepted doctrine that a passive verb, since it expresses the receiving of an action, presupposes an object and an agent. Occasional examples were given of full passive sentences, with the object noun preceding the passive verb construction, and the subject or agent noun following, in a prepositional phrase. There was then, as there is now, considerable confusion among the logical, grammatical, and material associations of the terms 'subject' and 'object.' The terms 'agent' and 'patient' in reference to persons rather than sentence parts appeared as early as 1617, but never gained much currency in grammars until recently. 'Patient' went out of fashion altogether by 1775, and remained thus until Chafe and others resurrected the term circa 1970.

Eventually, the notion 'grammar of English' was established: the idea that the language had a structure of its own, describable in its own terms rather than supposedly universal Graeco-Latin categories, became a widely if not universally accepted teaching. There was, to be sure, considerable disagreement -- based largely on authors' idiosyncratic and often self-contradictory views -- as to which categories and distinctions were relevant, and which were not. From the mid-18th century onward, grammars became increasingly prescriptive, in response to a widely-felt need for regularization; professions to advocate the usage of the 'best' authors and speakers, however, frequently turned out to be catalogues of the authors' own pet solecisms and the remediation thereof. It remained for the 'scholarly' grammars -- as distinct from 'school' grammars, just described -- of the 19th and 20th centuries to clarify and refine descriptions of English structure on the firm basis of massive documented research into actual usage.

The Scholarly Grammars

The traditional grammarians of the twentieth century were by no means unanimous in their conceptions of voice, any more than their predecessors had been. Some, indeed (e.g., Kruisinga & Erades, 1953), made no formal distinction among participles used as predicative adjuncts and predicative participles of state and occurrence, including passives, in the usual sense: all are similarly related to the subject of the predication, they claimed, and this semantic relation is mediated by a verb of 'little or no independent meaning' such as _be_, or, in some cases, no overt verb at all (_ibid_., pp. 39-41, 231-46). Nor are there, in their view, any clearcut semantic criteria by which subtypes of the predicative participle construction might be unequivocally differentiated:

> The distinction between the participle of state and condition and that of occurrence is not in all cases clear, as in a sworn enemy; the addition of a group with by often suggests an occurrence, but not necessarily, as in . . . I'm afraid our friends aren't too pleased by the meeting . . . (*ibid*., p. 245)

It is fairly clear, in the Kruisinga-Erades view, that, insofar as passives are conceded to exist at all, as an amorphous subclass of participial predication, that the 'agentless' variety is the basic occurrent, with 'full' passives involving the accretion thereto of a by-phrase. Since no mention of a possible active counterpart can be found at all, even in reference to other analyses of English, one must conclude that voice was a nonexistent category in their scheme. This was a radical departure from tradition, but a rather natural extension by Erades of Kruisinga's longtime approach, which for decades had exhibited formal and structuralistic leanings.

Kruisinga (1931, pp. 305-40) had reserved the term 'passive' for participles of activity or occurrence (e.g., 'the book is sold for five shillings'; 'thanks were offered'), and emphasized their formal indistinguishability from participles in attributive use (e.g., 'the book is sold'). But because passives were not, in his view, restricted to transitive verbs, and do not always have a viable corresponding active, Kruisinga warned against imagining passives to be derived as a matter of principle from actives. And yet, Kruisinga's heterodoxy had fairly prosaic roots: where systematic active-passive relations did exist, he described them, and held that "it is not really the verb alone that is used in the participle construction, but the verb with its direct object, which form an inseparable semantic group." The passive "is more freely employed than the attributive participle," Kruisinga went on, "and makes it possible . . . for a verb of activity or sensation to be used without the mention of an agent" (1931, p. 313).

Kruisinga's early emphasis on the relational aspect of grammatical voice is reminiscent of Henry Sweet's succinct characterization, one generation earlier:

> By voice we mean different grammatical ways of expressing the relation between a transitive verb and its subject and object . . . . The passive voice is, therefore, a grammatical device for (a) bringing the object of a transitive verb into prominence by making it the subject of the sentence, and (b) getting rid of the necessity of naming the subject of a transitive verb. (1891, pp. 112-3)

The implicit claim of active-passive synonymy is clear, in Sweet's view, as is the priority of agentless uses of the passive, and these were notions that were fairly well crystallized and widely accepted by the turn of the century. The restriction to transitive verbs, however -- i.e., verbs that implied a 'doer' and a 'sufferer' -- was a holdover from the 18th century, a semantic notion which would later be supplanted by formal and structural considerations.

Curme (1931, 1935, 1947), like Kruisinga, distinguished 'actional' passives from 'statal', but he was justified in calling both types passives because he, like Sweet, admitted only transitive verbs to the category. He bemoaned the passing of weorthan from English usage, and hoped that 'get' would come to replace it as the actional auxiliary (1931, p. 446). Curme treated actives and passives quite independently, however, and gave no hint as to whether he considered them to be related in any way, either formally or semantically.

The most thorough exponent of active-passive inter-relatedness among the scholarly grammarians was Otto Jespersen (1924, 1933, 1909-49). Actives and their passive counterparts "mean essentially the same thing," in his view, "and yet they are not in every respect exactly synonymous . . . it is therefore not superfluous for a language to have both turns" (1924, p. 167; 1933, p. 120). The central factor, to Jespersen, was that the speaker has two different ways of expressing "one and the same idea", according as the 'point of view' is 'shifted' "from one to the other of the primaries contained in the sentence . . . As a rule the person or thing that is the centre of interest at the moment is made the subject of the sentence, and therefore the verb must in some cases be put in the active, in others in the passive" (ibid.).

Jespersen made an explicit case for the structural regularities between actives and passives (1924, p. 164), in a quasi-algebraic formulation that anticipated Zellig Harris' passive transformation (1952, p. 21) by a whole generation. This, along with frequent allusions to what function a given constituent would have served, if the idea had been expressed in the other 'turn', created a strong impression of cohesiveness and unity of approach which does not, however, entirely bear scrutiny. Jespersen's treatment was basically an echo of Sweet's (cited above), in that the domain of voice alternation, as defined, can encompass only those verbs and their co-occurrents which can be expressed equally freely in either 'turn'. This, as Sweet made explicit, excludes all but transitive verbs. Some of the examples given by Jespersen -- e.g., 'The city is well supplied with water'; 'Justice shall be done everybody' (1933, pp. 120-1) -- while entirely admissible under a more liberal criterion such as Kruisinga's, were clearly beyond the limits set by Jespersen's own definitions. Though he had warned against confusing notional and formal criteria (1924, p. 165), Jespersen, like everyone else at the time, was striving to overcome the legacy of the past, and was still governed more by the former than by the latter.

The scholarly grammarians inherited a tradition which had taken two hundred years to break free of its Latin shackles, and another century to regularize the written language of Englishmen, if not their speech, to any great extent. During that epoch, the voice phenomenon gradually ceased to be thought of as a verb type classification, and came to be characterized as a choice of two manners of speaking, with the verb as the focal, but not the only relevant element. This, at least, the early 20th century scholars held in common, though they differed considerably in the details of their individual approaches. The one goal they did not all successfully achieve -- effecting a true separation of notional and formal criteria -- was left to their successors; though flawed, the legacy they passed on was far richer than that which they had received.

Structuralist Descriptions

Early American Formalism

The first half of the twentieth century in North American linguistics was a time when serious efforts were made to integrate into an autonomous scientific discipline the best methods and findings of such heretofore diverse pursuits as nineteenth century historical-comparative and philosophical-descriptive linguistics, as well as the "practical descriptivism of missionaries and anthropologists" (Hockett, 1968, p. 9). With behavioristic psychology and positivistic philosophy adding their currents to an already turbulent confluence, linguistics little by little left off speculative philosophizing and turned its attention more and more to fact-gathering. The goal was "to understand language as *form* rather than as function or as historical process" (Sapir, 1924, p. 150). There was no alternative, when it came to describing unwritten aboriginal tongues, and it was a fresh, unbiased approach to familiar languages, as well.

Franz Boas began the new tradition: in seeking out the relations among 'phonetic groups' and corresponding ethnological phenomena, his 'analytical grammar' left little room for either Indo-European bias or philosophical unobservables (1911, pp. 10ff., 52ff.). The 'ideas' of person, tense, number, mood, voice, and the like "are quite unevenly developed in various languages," Boas warned; many of the categories considered essential in some languages may be quite irrelevant in others, and cannot be said to exist unless signalled by differences in phonetic or grammatical form (pp. 33-5).

Boas' student, Edward Sapir, drew attention to "the distinction between essential or unavoidable relational concepts [such as 'doer,' action, 'done-to'] and the dispensable type. The former are universally expressed, the latter are but sparsely developed in some languages, elaborated with a bewildering exuberance in others" (1921, p. 94). But since "all languages evince a curious instinct for the development of one or more particular grammatical processes at the expense of others," Sapir went on, "linguistic form may and should be studied as types of patterning, apart from the associated functions" (p. 60).

The Boas-Sapir emphasis on form as the sine qua non of linguistic analysis set the tone for generations of linguistic inquiry, but it was Leonard Bloomfield who advocated the near-total de-emphasis of meaning, and who outlined the necessary methodology for (ostensibly) meaning-independent language description (1926, 1933). Explanations couched in terms of 'ideas' or 'concepts,' or, for that matter, any attempt to 'explain' language structure at all, were to Bloomfield unconscionably mentalistic, and he rejected them out of hand:

> The nature of the episememe of full sentences has given rise to much philosophic dispute; to define this (or any other) meaning exactly, lies beyond the domain of linguistics. It is a serious mistake to try to use this meaning (or any meanings), rather than formal features, as a starting-point for linguistic discussion. (1933, p. 172)

This was in sharp contrast to Bloomfield's own previous views, which only a few years earlier had clearly championed a Wundtian mentalism (Bloomfield, 1914).

Grammatical voice, to Bloomfield, was a sentential matter, and he applied the labels 'actor-action' and 'goal-action' equally to one-word and multi-word sentence constructions, depending on the language in question, and provided of course that each sentence type was distinguished as a grammatical class in that language by correlated form-meaning differences. Latin, for example, has as 'sentence-words,' *amat* 'he (she, it) loves,' *amatur* 'he (she, it) is loved;' *cantat* 'he (she, it) sings,' *cantatur* 'it is being sung' (1933, p. 173). The 'actor-action' and 'goal-action' were among the 'favorite' sentence types of many languages, Bloomfield thought, and the arbitrary class labels implied no particular structural order, for Tagalog sentences such as *pi'nu:tul nja ang 'ka:huj* (literally 'was-cut by-him the wood') and ki'na:in nang 'ba:ta? ang 'ka:nin 'was-eaten by-the child the rice' were also classed as 'goal-action' predications. Despite the formal sein-werden difference, however -- traditionally the mark of passives in German -- Bloomfield classed such constructions as hier wird getanzt (lit. 'here gets danced') and mir ist kalt 'to-me is cold' together, along with the Russian nuzhno 'it is necessary,' as 'impersonal' sentences, because this type "differs [from actor-action] by not containing any actor" (1933, p. 174). He rejected the use of meaning "as a starting-point for linguistic discussion" (see above), but was apparently not averse to its entering the analysis at a later point.

On the subject of voice in English, however, Bloomfield was regrettably imprecise. On the one hand, his 'actor-action' sentence type clearly included intransitive constructions such as 'John ran away,' and was thus more inclusive than most traditionalists' 'active' class. But, although English passives can be construed both formally and semantically as a 'goal-action' clause type, Bloomfield claimed that English, unlike Russian, "has only one type of bipartite sentence," and that the terms 'narrative predication' and 'equational predication,' though frequently applied to English sentences, are quite superfluous (1933, p. 173). It would appear that Bloomfield rejected the notion of a voice dichotomy in English, but he did not exactly say so, in his major theoretical work Language; this ambivalence is reflected in his intellectual posterity, as well.

Post-Bloomfieldian Taxonomics

The kind of linguistic investigation inspired by Bloomfield's Language and 'Postulates' has been characterized by:

> . . . a general behaviouristic attitude and by a rather restrictive conception of scientific method, inherited from neopositivism and based on the notion of verifiability. Recourse to introspection or to the notion of mind was rejected. The sole proper object of study was thought to be a corpus of utterances; it was held that linguistics had the purpose of providing procedures for cutting up the utterances, and for grouping together the resulting segments . . . it was hoped that one set of procedures would provide for the whole grammatical structure; from the utterance to the morpheme. (Lepschy, 1970, pp. 110, 115)

Many of the post-Bloomfieldians have been roundly criticized (e.g., in Chomsky, 1956, 1957, 1961b, 1962) for their narrow item-and-arrangement approach to language description, and for their divorcement of grammar from semantics. But it was one of the more eclectic among them, C. F. Hockett, who put things back into perspective: many of Bloomfield's disciples had indeed overinterpreted the master, and strayed far into the asemantic desert; their chief critic, Chomsky, however, in renouncing his 'I&A' origins, was as guilty at first as they of formalistic sterility, and all three -- Bloomfield, Bloomfieldians, and transformationalists -- have been wrong in treating language as a rigid, deterministic system (Hockett, 1968; Lepschy, 1970, pp. 118-9).

Some post-Bloomfieldians were more formalistic than others. All agreed that correlated form-meaning differences were the primary basis for classification, but they differed in their proclivity for mentalistic faux pas, and in the extent to which discussions of meaning were permitted to taint their analyses. As far as grammatical voice is concerned, the extreme formalistic view was that there is no difference at all, at least at the level of sentence type. Though one cannot be certain, this seems to have been the view taken by Bloomfield himself. Bloch & Trager (1942), however, were quite explicit about the matter, and they took Bloomfield quite literally:

> . . . the English actor-action construction . . . is the FAVORITE SENTENCE TYPE of English . . . some object performs some action (or undergoes some action, or is in or gets into some state, and so on) . . . In meaning, the nearest English equivalents of Latin passives are actor-action expressions of certain special types (John got chased away, was loved, was being beaten up, and so on) . . . this English passive is a matter of syntax -- not, like the Latin passive, a morphological category . . . the phrase is built or the like is only one of several types of phrases consisting of a verb plus a past participle (has built, got built). Formally, English is (loved), just as much as is (lazy), must be classed with builds (a house) or has (built a house). (pp. 74-5)

It was a difficult pace that Bloch & Trager set, for not all Bloomfieldians would go as far as to admit of only one basic declarative sentence type in English. Nida, for example, in the latest published version of his 1943 dissertation, devoted a small chapter to 'independent goal-action clause types' (1966, pp. 140-7). This unusual analysis, an otherwise objective taxonomy of form-class co-occurrence patterns, made explicit reference to "the underlying transitive construction" and to the "[2nd] attributive" of its verb-phrase head (i.e., its direct object), which "becomes the subject head of the goal-action clause" (p. 141). The subjects of goal-action clause types, Nida further pointed out, are structurally indistinguishable from those of intransitive clause types; "semantically," however, "they are parallel with [2nd] attributives to transitive verbs, for the goal-action clause may be derived from the transitive clause by grammatical transposition of component parts" (p. 140).

Nida's quasi-transformationalism was a post-Chomskyan, or at least post-Harrisian, accretion to his basically taxonomic approach, for the original version of his dissertation contained no mention of any "underlying transitive construction;" the "so-called 'passive' inversion" was nevertheless very much in evidence, and object preposing was referred to at least twice (1943, pp. 169-71). This was not unusual, however, for the 'variant of active' view of passives was rife long before structuralism. Besides, as Lepschy has noted (1970, p. 114), linguistic theory, even in the second decade after Bloomfield's Language, was still vacillating between the pre-Bloomfieldian 'item and process' approach and pure 'item and arrangement' formalism, and Nida himself was not always able to keep his writings completely free of mentalism. Nida's goal-action explanations, furthermore, fell short of being completely transformationalistic in that no mention was made of agentive by-phrases occurring as post-verbal adjuncts; although the pre- and post-verbal alternation of the 'underlying' direct and indirect objects was adequately dealt with, the agent-subjects of underlying transitive constructions were ignored.

Two influential structuralist grammars of English published in the 1950's offer a further contrast between the strictly formal approach to voice and a somewhat less hidebound view. The earlier work, Fries' The Structure of English (1952), was thoroughly Bloomfieldian, classifying formally distinct utterances in terms of the 'oral' or 'action' responses they evoked, and analyzing a corpus of utterances as sequences of 'form-classes.' No mention of either active or passive voice was made as such, but occurrences of "the forms of be or get as function words with the so-called 'past participles'" were noted as a special subclass of Class 2 word constructions, signalling that the 'structurally bound Class 1 word' (i.e., the subject of the sentence) was either the undergoer or the beneficiary of the action performed (pp. 180ff.). Other subject meanings in statements -- 'performer,' 'identified,' 'described' -- were signalled by other verb constructions, but did not constitute distinct utterance types. Voice phenomena in other types of utterances, as in many grammars before and since, were not discussed.

A. A. Hill's Introduction to Linguistic Structures (1958) provides a good example of a traditionalistic structural grammar of English. Hill classified the 'passive' participle formally as but a subtype of two-verb constructions ending with the 'form 5' (i.e., past participle) of some verb, the distinction being between 'have' and 'be' or 'get' as the first element of the phrase (pp. 152-4, 191, 216). Like Nida, Jespersen, Kruisinga, and Sweet before him, however, Hill saw active and passive sentences as highly inter-related: _be/get_ + Past Participle phrases were "syntactically required" in _Noun_ ... _by_ _Noun_ contexts, in his view, and:

> all such sentences can be interchanged with sentences in which the _by_ is omitted, and the position of the nouns is reversed, whereupon a simple verb form is required . . . the subject of [i.e., that noun which 'selects'] the first verb is not the actor, the actor being indicated by a phrase in _by_. (pp. 211, 216)

Hill's analysis of "syntactically required" multiple-verb constructions included all those which subsumed the basic passive phrase, up to the maximal _modal_-_have_-_been_-_being_-_verb+ed_ sequence (1958, pp. 219ff.); this was in contrast with Nida's treatment, which limited verb phrases in goal-action clauses to three elements, e.g., 'is helped,' 'has been helped,' 'is being helped' (1966, p. 140).

The English Syntax Workshop held in Austin, Texas, in the summer of 1960 produced two very different structuralistic accounts of verb morphology and syntax: W. F. Twaddell's _The English Verb Auxiliaries_ (1963), and Martin Joos' _The English Verb_ (1964). The former, like Hill, viewed the head of a verb phrase as having as many as four 'modifications,' in addition to a possible modal auxiliary, including tense (past or non-past), 'current relevance' (have + participle), 'limited duration' (be + ing), and passive (be + participle). Twaddell did however point out, as had few if any before him, that constructions with three or four co-occurrent modifications were infrequent, and that the inherent meaning of certain lexical verbs is incompatible with the semantic signals of 'limited duration' or of passive (1963, pp. 2-3). As to the meaning of the passive modification, Twaddell accepted the traditional notion that it signals the subject's undergoing an action or effect, rather than "producing or constituting an action or state." The absence of such modification, however, was not to be construed as a signal of non-passive meaning, nor necessarily as a signal of active meaning, for "English grammar has no active voice, and 'Active' meaning is at most a compatible incidental by-product of the semantics of direct-object grammar" (p. 12).

As might be expected in a book-length treatise on verbs in English, Martin Joos' description of voice was somewhat fuller than most in the structuralist tradition. Like Fries, Joos adduced evidence from a corpus to substantiate his descriptive statements and, although he had no qualms about using traditional terminology, he was also inclined to be conceptually innovative. Joos' analysis concurred with Twaddell's, in that the absence of passive marking was not seen as a signal of active meaning, nor necessarily of non-passive meaning, but there the similarity ends.

Formally, a passive for Joos is any 'BE -N' construction whatever, and its meaning is privative or 'anti-referential,' rather than additive. Since verbs which are unmarked as to voice may signal either active meaning, in Joos' system, or 'primary passive meaning' -- as in 'it steers hard' -- "the meaning of BE -N is that it deprives the verb-base of active meaning," leaving the passive interpretation "as a residue" (1964, pp. 96-8). Put another way, the subject in any subject-verb partnership designates some entity intimately involved in the event; passive marking on the verb simply eliminates the possibility that it be the actor (p. 95).

In addition to 'primary' passives, which have as subject the 'victim' (i.e., direct object) in the event, Joos defined secondary passives, which have the indirect object or beneficiary entity as subject, and also tertiary passives. These latter -- e.g., 'I was made a fool of'; 'such a dress can't be sat down in' -- are probably better known as pseudo-passives; like Joos' unmarked primary passives above, -- otherwise known as pseudo-intransitives (Lyons, 1968, p. 376) -- tertiary passives do not figure in most grammatical descriptions except implicitly, where a widely inclusive formal criterion such as Joos' 'BE -N' obtains.

The work of Zellig Harris is often said, erroneously, to typify post-Bloomfieldian structuralism. The rigor with which Harris developed consistent and explicitly formal descriptive techniques based solely on the shape of linguistic units and their distribution certainly epitomizes the trend, but, as the foregoing survey has shown, not all structuralists took such an extreme view of Bloomfield's legacy. Harris' morpheme-to-utterance approach -- developed through the 1940's and summarized in Harris (1951) -- is thus hardly typical of an entire generation of linguists. As Hockett has put it:

> Harrisian descriptive linguistics, with its almost sole emphasis on data-manipulation, is terribly narrow. It ignores much of the tradition in our field. It affords no clue as to the possible functional relation between empirical investigation on the one hand, generalizing and theorizing on the other. (1968, p. 36)

In Harris' approach, English verb phrases as morpheme sequences were to some degree mutually interchangeable, as far as constructional meaning was concerned; or at least they were equivalent to one another if only as alternative instances of some higher-order grammatical entity, and ultimately substitutable for an all-encompassing 'V' in some structural equivalence formula. As to constructional meanings, nothing mattered but that they be "common to all the occurrences of a particular construction, no matter what the individual morphemes involved" (1951, p. 347); this definition left no room for mentalistic discussion of what such meanings might be. The subject of grammatical voice could never arise, in such a sterile descriptive framework, and it did not appear in Harris' work until the problem of discourse analysis was tackled (Harris, 1952). It was then that Harris realized that his basic 'logic of distributional relations' and its associated descriptive algebra could not be generalized indefinitely to account for longer and longer linguistic constructions, and grammatical transformations as the key to clausal co-occurrence equivalences were the result (Lepschy, 1970, p. 120).

Early Transformationalism

The most noticeable feature of generative-transformational treatments of grammatical voice has been the severe restriction of the category to those inter-related voice alternates which are amenable to that mode of description, namely, transitive actives, 'agentful' passives, and 'truncated' passives with clearly implied agency. Transformationalism's superiority in formal rigor, descriptive power, and explicitness, in other words, was purchased at some loss in scope. Where other theorists' ignoring of certain voice aspects was motivated by a theoretical stand on correlated form-meaning differences, or by mere disinterest, that of transformationalism was the result of a conscious choice of descriptive metalanguage: that which could be described was in many cases amplified, but in the case of voice it was restricted, to that which was transformationally generable.

Zellig Harris' purpose in developing the prototype transformational grammar was not so much to generate the sentences of a language -- that was a concomitant better developed by Chomsky -- but rather to provide a compact summary of the overall structural organization of languages in general, as manifested in their unbounded sets of well-formed sentences:

> Our picture of a language, then, includes a finite number of actual kernel sentences, all cast in a small number of sentence structures built out of a few morpheme classes by means of a few constructional rules; a set of combining and introducing elements; and a set of elementary transformations, such that one or more transformations may be applied to any kernel sentence or any sequence of kernel sentences, and such that any properly transformed sentences may be added sequentially by means of the combiners. (Harris, 1957, p. 339)

The 'generativity' of Harrisian grammar, like that of most other language descriptions, resided primarily in the reader, and in his ingenuity in applying the general descriptive statements. Harris' morpheme sequence-class equivalences -- both the constructional and the transformational -- were more explicit, and thus potentially more productive than any earlier grammatical description, but they still required considerable human intervention before any 'concatenations of hierarchically included constructions' (ibid., p. 338) were forthcoming as instances of meaningful message patterns. The reason, as Harris himself noted, was that:

> This compact description of sentence structure in terms of sequences of classes is obtained . . . at a cost: statements such as NPN = N or 'TNV is a sentence structure' do not mean that all members of NPN have been found in the same environments as all members of N or that all sequences of members of T, N, and V in that order have been found as sentences.
>
> On the other hand, to describe a language in terms of the co-occurrences of the individual morphemes is virtually impossible: almost each morpheme has a unique set of co-occurrents. (ibid., pp. 284-5)

Chomsky's first version of a transformational grammar

(1957, 1961a) was a considerable improvement over Harris', in that a set of Chomskyan formulas gave rise to as many of the sentences of language L as did Harris', but generated no non-sentences. This Chomsky accomplished by constraining the generative process in two important ways, i.e., by building generativity into the grammatical description, thus making it independent of the ingenuity of the user, and, through the use of context-sensitive phrase-structure rules, for example, by making the descriptive formulas sensitive to anomalous lexical collocations, and thus precluding their generation. These constraints would not have been possible except that Chomsky rejected Harris' loosely algebraic method of symbol-string generation, and adopted instead a unidirectional formal deductive automaton which consisted of only one initial axiom, and of formation and transformation rules, the ordered application of which led by a number of determinate 'routes' to a terminated derivation. Only the end result of a derivation was, by stipulation, a well-formed symbol-structure representing a sentence of the language. This descriptive organization contrasted sharply with that of Harris' system, wherein every stage of the derivational procedure represented a sentence or class of sentences (i.e., a linear combination of kernel-like structures), but where derivations themselves were unconstrained.

These formal differences between Chomskyan and Harrisian sentence-generating systems governed, and to a certain extent were governed by, the way in which active and passive constructions were dealt with. In Harris' system, the passive transformation was but one of a number of inter-construction functional equivalences with respect to co-occurrence privileges; its particular content was that for every $\underline{N}^1\text{-}\underline{v}\text{-}\underline{V}\text{-}\underline{N}^2(\text{-}\underline{X})$ sequence in English -- or any of its functional equivalents, according to the stated rules -- there is an $\underline{N}^2\text{-}\underline{v}\text{-}\underline{\text{be}}\text{-}\underline{\text{Ven}}\text{-}\underline{\text{by}}\text{-}\underline{N}^1(\text{-}\underline{X})$ or $\underline{N}^2\text{-}\underline{v}\text{-}\underline{\text{be}}\text{-}\underline{\text{Ven}}\text{-}(\underline{X})\text{-}\underline{\text{by}}\text{-}\underline{N}^1$ with the same privileges of occurrence in discourse and the same 'invariant information content' (1957, p. 290), for a given *n*-tuple of morphemes. Thus, for example, 'Sam saw the wreck by the seashore' is interchangeable with 'The wreck was seen by Sam by the seashore' and 'The wreck was seen by the seashore by Sam' (*ibid*., pp. 325-6).

The reverse, however, is not always the case, for while a sentence such as 'The wreck was seen by the seashore' might have innumerable active counterparts or paraphrases, it has no uniquely specifiable active *transform*, and the unique associability, by means of formal mapping relations, of members of systematically related construction types is the basic linguistic relationship transformations were designed to express. It is, in fact, the only relationship a transformation can express, and where such a relationship does not exist, there can be no transformation. Thus, while an inverse $\underline{T}(p)^{-1}$ of the passive transformation may be algebraically defined (*ibid*., p. 334), it may not in general be applied without engendering semantic anomaly at least some of the time, as with 'constructionally homonymous' agentive and locative by-phrases (ibid., pp. 288, 325). And despite Harris' unqualified claim to the contrary (ibid., p. 334), "many-one" transformations, or any in which the n-tuples of morphemes that satisfy one construction are a proper subset of those which satisfy the other (ibid., p. 330) have no definable inverse, and must be considered unidirectional.

The directionality which is inherent in generative-transformational grammars -- despite Chomsky's later (1971) protestations to the contrary -- circumvented many of the shortcomings of Harris' morpheme-to-utterance algebra, and was no doubt largely motivated by them. The purpose of Chomsky's constrained descriptive automaton -- initially, at least -- was largely the same as that of Harris', i.e., to provide, by means of a few simple hierarchical constituency rules, for the most basic and maximally independent sentential structures of the language (the 'kernel'), and to describe, in rules of a more relational than constructional character, how every sentence of the language was ultimately related to, and in some cases composed of, one or more of the basic structural types. But Chomsky's goals went beyond the mere refinement and extension of Harris' analytical and descriptive methods: where Harris never treated his transformational formulae as anything but a heuristic for discovering equivalence classes of longer constructions useful in discourse analysis, Chomsky rebelled against

Harris' "theoretical nihilism" and made generative-transformational descriptions the basis of "an elaborate and coherent theory of language which differs strikingly from any proposed by linguists or philologists, or by psychologists or philosophers, during the last hundred years or more" (Hockett, 1968, pp. 35-6).

Chomsky's later theory did not, of course, spring full-blown into existence, but rather grew, over the years. The nature of Chomsky's 'psychologization' first became evident in his polemical 1959 review of B. F. Skinner's Verbal Behavior (esp. pp. 43, 56ff.), and it seemed to grow rapidly from that point on (cf. Steinberg, 1975). These later aspects of generative-transformational theory are discussed more fully below.

The early years of the Chomskyan hegemony were characterized by a widespread disestablishmentarianism, an earnest need to do away with the notion of "grammar being essentially a list of the elements (and classes, sequences, etc. of these) discovered by procedures of analysis," and to establish "the grammar itself" as "the primary end of linguistic analysis, and [with perfect circularity!] the constructions, phrases, etc., of the language under analysis [as] those provided by the structural descriptions . . . that are the by-products of the generation of sentences by the grammar" (Chomsky, 1962, p. 132). In such a theoretical framework, the generative-transformational rules which were at once the goal of linguistic research and the means of achieving that goal were endowed with a status that was more than merely descriptive: as "part of an attempt to construct a formalized general theory of linguistic structure" they formed the basis of an elaborate and extended argument that "such fairly abstract linguistic levels as phrase structure and transformational structure *are required* for the description of natural languages" (Chomsky, 1957, pp. 5, 11, 106; emph. added).

The passive transformation was crucial to Chomsky's whole thesis. He cited the lack of such a rule as a glaring gap in pretransformational linguistics (1957, p. 6; 1962, p. 124), and frequently used the 'behavior' of sentences under passive transformation -- assuming it proven there was one -- as evidence for the formulation of other transformations (1957, pp. 76, 81-3, 101), and as evidence for the disambiguating power of two-level syntactic descriptions in general (*ibid*., pp. 87-90). But more importantly, Chomsky took the passive transformation as the "paradigmatic instance" for transformational rules in general: if it could be proven for actives and passives in particular, then it could be proven in general that "there are very clear and easily generalizable considerations of simplicity that determine which set of sentences belong to the kernel and what sorts of transformations are required to account for the non-kernel sentences" (*ibid*., p. 77). "For every sentence *NP*^{1} -- *V* -- *NP*^{2} we can have a corresponding sentence *NP*^{2} -- *is* + *Ven* -- *by* + *NP*^{1}," went the argument, and since it is descriptively inelegant for both to be accounted for as part of the kernel of the language -- it being an apparently foregone conclusion that descriptive elegance and logical necessity are one and the same -- one has only to decide whether it is more parsimonious to derive A from B or B from A, for the behavior of noun-complement verbs under passivization proves "quite conclusively that the passive must be based on an inversion of subject and object" (*ibid*., pp. 43, 79).

The soundness of Chomsky's persuasive chain of argument is only apparent, for its tortuous involutions tend to conceal the speciousness of the so-called 'proof,' and let slip by unnoticed the fact that a sizable class of syntactic constructions is being treated as a formal subclass of a more fully specified but relatively rare sentence type, all in the name of insight, elegance, and descriptive economy. Chomsky's approach to the voice phenomenon was if anything narrower than Harris': only 'agentful' sentences of the form *NP*^{2} - *Aux* - *be*+*tense* - *Verb*+*en* - *by* - *NP*^{1} (that is to say, assuming the a priori existence of that formal relation the necessity of which was being argued for, nothing but stipulatively correct transforms of some *NP*^{1} - *Aux*+*tense* - *Verb* - *NP*^{2}) were fully accorded the label 'passive.' The far more frequently occurring agentless constructions -- over 70 per cent of all passives, according to Jespersen (1924, p. 168; 1933, p. 121), and well over 80 per cent, in Svartvik's survey (1966, pp. 141ff.) -- were analyzed, somewhat perfunctorily, as trivially derivable truncates of the agentful, by both Harris (1957, pp. 330, 333) and Chomsky (1957, p. 81 fn. 7). Chomsky's problem, like Harris', was that transformation rules, if they are to function as interlocking parts of a purely formal descriptive system, cannot invent structure or lexical contentives such as unmentioned agentive nominals; at most they can only permute or delete that which is overt in a formal symbol structure. Unlike Harris, however, Chomsky felt constrained to make a virtue of necessity: since accounting for both construction types in a systematically related formal pair as part of the kernel is ruled out a priori, on grounds of descriptive elegance -- meaning- or discourse equivalence now having nothing to do with the case (Chomsky, 1957, Chs. 2, 9) -- and since deriving actives as transforms of passive kernels "leads to a much more complex grammar" than the reverse, "we are forced to take actives, not passives, as the kernel sentences" (ibid., p. 79).

Chomsky's appeals to simplicity criteria, even with Bloomfield himself as the authoritative precedent (ibid., p. 81 fn. 6), are no proof of the necessity for generative-transformational language descriptions, and certainly no substitute for valid formal evidence; there is hardly a supporting argument offered which is not enmeshed in circularity, and which does not depend on one's prior acceptance of the probandum for its credibility. For example:

(a) that the passive aspectual elements be and -ed occur only with transitive verb heads (ibid., p. 42) is not new, nor is it beyond dispute; its validity depends on where one draws the line between 'true' passives and 'pseudopassives,' and that, as the present work has attempted to show, is not always a simple matter (see p. 25, above).

(b) the requirement that be+en precede only transitive verbs, yet never be followed by a Vt + NP (as in *Lunch is eaten John) seems necessary, yet contradictory, since requiring or at least permitting a nominal on the right is the usual formal definition of transitivity in underlying structure (assuming, again, the a priori existence of such a level of description); to argue further that 'consider a fool,' in order to account for its occurrence in sentences such as 'John is considered a fool by everyone,' is in reality something other than a Vt + NP construction (Chomsky, 1957, pp. 78-9) has some basis in the behavior of verb complements, but this too is at least partly necessitated by the prior assumption of a meaning-independent notion of transitivity in a transformation-feeding phrase-structure level of description.

(c) the claim that "if V is transitive and is followed by the prepositional phrase by + NP, we must select be+en" in a transformationless phrase-structure grammar (*ibid*., p. 42) is simply not true, as sentences like 'John is eating by the window' will readily attest; nor does the somewhat different claim (*ibid*., p. 43) that *be*+*en* "must occur before *Vt* + *by* + *NP* (where *V* is transitive)," for agentless passives are legion. It is to be noted in this connection that Chomsky, like Harris, did not consider agentive *by* + *NP* phrases to be anything other than prepositional phrases, and was at pains to account explicitly for this formal equivalence, even though it required an ad hoc rule (*ibid*., pp. 73-4).

The passive transformation, in short, owes its enshrinement in linguistic thought to a tendentious compilation of circular arguments, most of which are reducible to a single fallacy, namely: if, purely for the sake of argument, one assumes a two-level generative-transformational system of language description, there follow of necessity from this system -- and from no other -- certain linguistically relevant formal consequences not observed in any corpus, and the fulfillment of these logical 'predictions' in the perceived structure of potential utterances proves the validity of the initial assumption. This is rather like arguing that since anything the Bellman* says three times is true, and since 'Paris is the capital of France' is true, then the Bellman must have said it three times. Both these arguments are invalid, and not because of any fatuous content, but purely because of the argument form employed: the truth of the antecedent in an implication may not unequivocally be inferred from the confirmed verity of any of its consequents, no matter how inescapable the entailment, for the truth of a consequent is not related solely to the truth of the antecedent. As Caws (1965, p. 111) has put it, death inevitably follows a great many antecedent events, not only the ingestion of arsenic.

---

* in *The Hunting of the Snark*, by Lewis Carroll.

The validity of the 'two-level description' thesis is further contingent upon the supposed uniqueness and inevitability of the consequences of generative-transformational description; these, like the Bellman's 'three-fold incantation' hypothesis (Sutherland, 1970, pp. 218-20), are fraught with further fallacy. Taxonomic item-and-arrangement grammars are demonstrably inadequate in their 'generative' capacity only to the extent that they are transformation-feeding phrase-structure grammars, and the truth of that cannot be established by mere reiteration (see Reid, forthcoming [a]). The worst that could be said of them, furthermore, was that they are "ad hoc and unrevealing;" the only taxonomic claims thus invalidated, if any, are those imputed to pretransformational linguistics by Chomsky himself (1957, Chs. 4, 5; 1961b, p. 220; 1964, pp. 11ff.). The co-occurrence restrictions on be...-ed, as in (a) - (c), above, simply are what they are; to say that such are an automatic consequence of the passive transformation

(Chomsky, 1957, p. 43) has no meaning except in a two-level descriptive system, and cannot constitute evidence that such a system is the uniquely correct representation of linguistic structure. Generative-transformational grammars, therefore, are more a matter of descriptive convenience than logical necessity, and the most that can be said for them -- as if it were not enough -- is that they are "the only one known which is not extraordinarily complex and which provides anything like a reasonable structural description" (Postal, 1964, p. 151).

Aspects and Later Formulations

The spectacular growth of generative-transformational theory between 1957 and 1965 is so diversified and well-known as to preclude detailed review here. However, if one were to formulate a rubric which subsumed most of the theoretical revisions and advances of that period, it would be this: attempts were made to deal formally with meaning, both grammatical and lexical. Generative-transformational grammar remained a more or less explicit set of rules which, rather than make any appeal to the reader's *faculté de langage*, strove "to *incorporate* the mechanisms of this faculty" (Chomsky, 1966b, p. 12 [emph. added]). The purpose, however, was no longer merely to generate "all of the grammatical sequences of L and none of the ungrammatical ones" (Chomsky, 1957, p. 13; 1961a), but to 'relate signals to semantic interpretations.' And since "the competence of the speaker-hearer can, ideally, be expressed as a system of rules that relate signals to semantic interpretations of these signals," "a grammar, in the traditional view [!], is an account of competence" (Chomsky, 1966b, pp. 10, 12).

The notion that the object of linguistic theory was "to explain the ability of a speaker to produce and understand new sentences, and to reject as ungrammatical other new sentences, on the basis of his limited linguistic experience" was not particularly new in mid-1960s transformationalism, since the thought had been expressed -- more as a fond hope than as a statement of reality -- in one of Chomsky's earliest monographs on the subject (1956, p. 113). What was new, in Aspects-type grammars, was that generative-transformational automata now included symbol-manipulating rules for attaching purely semantic markers to underlying syntactic configurations, for transforming these abstract representations of lexical and grammatical information into their associated linear signal sequences, and for mechanically deriving from each syntactosemantic 'deep' structure a set of 'readings' -- one for each possible interpretation -- representing diagrammatically how the linear signal is supposed to be understood by adult speakers. Until the concept of analyzing linguistic properties into their relevant features had been extended from phonology to syntax and semantics, and formal operations devised for accommodating such feature symbols in descriptive calculi, it was not possible for

Chomsky's long-range goal even to be attempted, in a sentence-enumerating language description; some revision of the interdependent roles of formation and transformation rules was also required, in order to account unequivocally for polysemy, paraphrastic equivalence, and other forms of 'equivocation.' Aspects-type grammar (Chomsky, 1965) was thus the fruit of much collaboration, with Lees (1960), Katz & Fodor (1963), and Katz & Postal (1964) making important contributions.

One serious defect of the 1957 model of grammar which was not remedied in the Aspects version, and which has not been put right yet, however, is the fundamental fallacy upon which the entire theory is founded, i.e., the notion that a heuristic initial assumption is proven of necessity valid by the verification of its logical consequences. If anything, the 1965 theory and subsequent developments have compounded the original error: the distributional analysis of language structure being such an inherently circular process (Harris, 1954, pp. 147-8) -- and transformationalism being nothing if not distributionalistic (Reichling, 1961, p. 7; McCawley, 1968, p. 557) -- every attempt at generative-transformational language description in the past twenty years has been a fount of self-fulfilling 'predictions,' and the resulting illusion of ever-widening empirical support has become attached by association and by fiat to the grammar-as-a-theory-of-competence myth. This is a dangerous trend indeed, for it represents a perversion of the empirical approach to knowledge-getting, of how knowledge of a publicly verifiable sort may be responsibly arrived at: experimentalists, as Johnson-Laird has pointed out, find Chomsky's epistemological methods and assumptions "baffling to the point of apoplexy" (1975, p. 263). What linguistics needs today is a competence theory which takes cognizance of the sometimes theoretically inelegant pragmatics of language use, and the present work is part of an attempt to fill that need.

As far as the passive transformation was concerned, it was still one of the keystones of generative-transformational theory, in Chomsky's _Aspects_, but opinions concerning its form and function had vacillated considerably, over the years. Originally, on the basis of active sentences containing 'quantified' nominals versus their passive counterparts -- e.g., the meaning of 'At least two languages are known by everyone in this room' _vis à vis_ that of 'Everyone in this room knows at least two languages' -- Chomsky felt compelled to observe that:

> Not even the weakest semantic relation (factual equivalence) holds in general between active and passive. (1957, p. 101)

This view was consonant with the overall purpose of grammatical transformations in early Chomskyan grammars, which, except for the obligatory symbol-fixing rules, was to specify the systematic structural relations which hold between basic kernel sentence types and their illocutionally divergent derivatives. Katz & Postal, however, in order to account for illocutionary meaning in a coherent manner, required all aspects of meaning to be symbolically represented in the deep structure of a sentence, with non-identical deep structures representing non-identical collections of meaning. It was thus convenient for them to regard Chomsky's two cardinal examples (cited above) as equally ambiguous, and therefore not distinct from each other in semantic content:

> We can find no difference in meaning between actives and their corresponding passives. (1964, p. 73)

Chomsky's Aspects treatment of the passive transformation was ambivalent, in that he professed to accept the Katz & Postal position on the one hand, but maintained, on the other, that voice is still a unique phenomenon:

> The passive marker, as distinct from the question, negation, and imperative markers, has no independent semantic interpretation. Furthermore, . . . there are good reasons to distinguish such transformations as passive from purely stylistic inversion operations. (1965, p. 223 n. 3)

Passives, in other words, are very different in form from their corresponding actives, and hence a transformation-triggering symbol in deep structure is a logical necessity; but since voice opposites mean more or less the same thing, that symbol is, by fiat, to be considered semantically empty. However, Chomsky goes on to say, actives and passives are not quite the full paraphrases of one another Katz & Postal claim they are (1964, p. 72), for the synonymy between them is different in kind from purely stylistic variation such as that between 'shifted' and 'unshifted' sentential adverbs, dative phrases, verbal particles, and the like. Experimental investigations (Prideaux & Baker, 1974; Reid, forthcoming [b]) have failed to corroborate this claim, but its intuitive persuasiveness is such as tends to be held against empirical evidence to the contrary. It is on the basis of just such deep-rooted conviction that Chomskyan competence theory has been formulated and developed.

In order to minimize the 'differentness' of the active-passive relation, as earlier formulated, and yet not submerge it completely in indifference, Katz & Postal and Chomsky resorted to a singularly devious tactic: the passive transformation was defined exclusively on deep structures containing an optionally-generated passive "dummy" which, as far as pure symbolic formalism was concerned, was no different in function from the illocutionary markers for interrogation, imperative, and negation; unlike the latter, however, the former was, on grounds of the paraphrasticity of actives and their corresponding passives, dubbed "semantically insignificant" (Katz & Postal, 1964, p. 73). Since the base rules which generated question and negation markers were as teleologically formulated as that which created 'by + PASSIVE' manner adverbials, the decision to attach semantic significance to the ones and not to the other seems somewhat arbitrary; it represents, furthermore, the first of many attempts to inject the human _faculté de langage_ by fiat into the workings of descriptive automata, and of as many diminutions in credibility for Chomskyan competence theory.

If one overlooks the formal shortcomings of _Aspects_-type description theory -- and one must, if there is to be any discussion at all -- the most cogent features of Chomsky's voice analysis come to the fore. It was, in intent, if not in formal implementation, more comprehensive than any previous analysis: by shifting the focus of verbs' co-occurrence patterns from direct object nominals to manner adverbials, certain normally intransitive verbs could be accommodated along with the usual transitive verbs, and 'pseudopassives' such as 'The new course was agreed on' could be generated by the same transformational rules as accounted for 'true' passives. In a sense, the principle was thus established that the subject of a passive locution need not be a 'victim' in the event, although Chomsky was somewhat unspecific as to what the syntactosemantic analysis of sequences such as 'agree on,' 'look up to,' 'work at,' and their NP complements might be (1965, pp. 103-5; 128ff.; Katz & Postal, 1964, pp. 72-3; 148-9). Establishment in principle was as far as the matter went, however, for the appellation 'passive' remained in effect restricted to those constructions whose subjects were at least victim-like, in relation to some predicated event: "we need not assume," wrote Lees (1964, p. 30 n. 6), "that every sentence containing _Aux_ + _be_ + _Vtr_ + _En_ is a direct passive derivative; in certain cases be may be the copula, even before a participle."

Ultimately, the 'victimhood' of subjects and the 'eventhood' of participial predicates depended descriptively on whether agency could be inferred in a given be -- V+ed predication, for it was only through this corollary that the former notions could be adequately formalized. Thus, the ambiguity of 'His excuse was contrived' vis a vis the unequivocalness of 'His excuse was very contrived,' on the one hand, and 'His excuse was contrived in a hurry,' on the other, was 'captured' by the fact that grammatical rules can be devised to generate the same surface string with or without the deletion of a 'dummy' agent nominal in deep structure. Basically, nothing had changed, since 1957: despite the obfuscatory theorizing about deep structure, surface structure, and obligatory, non-meaning-changing transformations, the voice phenomenon continued to be regarded, at bottom, as a two-way alternation between mutually exclusive but equal classes of agentive, quasi-transitive sentences, with agentless passives as a secondary subclass. The obligatory deletion of semantically empty agent nominals may have been more 'principled' in some sense than earlier accounts of omitted agency, but the continued existence of such a rule underlined the fact that the *sine qua non* of Chomskyan descriptions of voice remained, paradoxically, that grammatical category's most transient feature.

One of the reasons for generating agentive by-phrases as deep-structure manner adverbials in Aspects-type descriptions had been to assign these constituents a determinate place within overall sentence structure; this was something which a unified, multi-operation transformation, generating lexical items such as 'by' and 'be...-ed' ex nihilo, could do only in an ad hoc manner (Chomsky, 1957, pp. 73-4; 1965, p. 104). The determinacy of derived constituent structure was dismissed as totally irrelevant, however, as were agentive manner-adverbial by-phrases, in G. Lakoff's (1970) wholesale revision of Chomsky's Aspects theory. Originally written as a dissertation in 1965, when its target work was scarcely off the press, Irregularity in Syntax took issue with, among other things, the focal role played by MANNER constituents in Aspects-type passivization, as the locus within VPs of base-generated by + PASSIVE markers. The main flaw, as Lakoff saw it, was that co-occurrence or non-co-occurrence with a manner adverbial did not unequivocally characterize verbs as passivizable or non-passivizable. He contended, on the one hand, that stative verbs may not take manner adverbials freely, yet may passivize, e.g:

(a) Everyone knew (*cleverly) that Bill was tall.

(b) That Bill was tall was known by everyone.

Certain intransitive verbs, on the other hand, take prepositional phrase complements and manner adverbials, strongly resembling such constructions as 'work at (='do') the job diligently' and 'decide on (='choose') the boat suddenly;' some such structures, Lakoff claimed, do not 'pseudopassivize' acceptably, e.g:

(c) * The room was dashed into (impatiently) by John.

(d) * England was remained in (secretly) by Harry.

and yet all are formally admissible to passivization, in its Aspects formulation. The structural description

NP -- Aux -- V -...- NP -...- by + passive

(Chomsky, 1965, p. 104), in other words, did not guarantee all and only grammatically acceptable passive surface strings (but see Chomsky, 1965, pp. 217-8, n. 27).

The solution, according to Lakoff, was simple: dispense with the MANNER constituent altogether. Since manner (and other) adverbs can be derived from adjectival complements in embedded simplex sentences (pp. 165-73), the co-occurrence restrictions between subjects and manner adverbs can be accounted for "without any new selectional apparatus, [for] these restrictions will follow from the selectional restrictions between subjects and adjectives. Thus, the fact that we do not get The suit fit me carefully will follow from the fact that we do not get The suit was careful in fitting me" (p. 158). What this esoteric transformational relation (the formalization of which was not even hinted at) had to do with the fact that 'I was fitted (carefully) by the tailor' is an acceptable sentence, whereas *'I was fitted by the suit' is not, Lakoff left to the reader as an exercise, for his purpose, after the initial diversionary tactic, was not to amend the passive transformation at all, but to build a case against MANNER, LOC, TIME, and other adverbial phrase types as deep-structure constituents. Further evidence was drawn from the fact that Chomsky's resolution of the ambiguity in expressions such as 'John decided on the boat' depended ultimately on whether 'on the boat' functioned as a verb complement within the VP constituent or as a locative phrase to the right of it, not on the presence or absence of a dummy agentive phrase; passivization, Lakoff claimed, can thus be defined more simply on underlying structures like

NP -- AUX -- V -...- NP -...

"(where the leftmost ... does not contain an NP and where the rightmost NP is directly dominated by VP)," and there is no formal need for a MANNER constituent at all (pp. 162-4).

It is not considered sufficient, in grammatical argumentation, merely to show that one's preferred analysis accounts for the same 'set of facts' as someone else's; one must be able to demonstrate that the proposed analysis either accounts for more 'facts' or for the same facts more economically. As Chomsky once noted (1965, p. 218, n. 28), "the generalization that relates Manner Adverbials to passivization . . . is invalidated . . . . only if a more highly valued grammar can be constructed that does not contain it." Lakoff's attempt to present a 'more highly valued' analysis in this case (as in others -- see Botha, 1970, 1973) gave rise to some highly dubious reasoning:

what he seemed to be arguing was that since co-occurrence with manner adverbials is not perfectly correlated with passivizability, but can itself be transformationally predicted from related adjectival complements, the transformational derivation of adverb phrases is to be preferred; the grammar of English, furthermore, can thereby be simplified, for the passive transformation may be allowed, at no loss in generative power, to dispense with base-generated agentive manner adverbials, and to revert, basically, to its pre-Aspects formulation. What Lakoff seemed to be ignoring, however, was that this proposal did not provide, as did Chomsky's analysis, for a determinate way of inserting agentive by-phrases and auxiliary be...-ed phrases into P-markers. Nor did it attempt, as did the Aspects version, to effect a separation and ordering of verb-complementing and VP-complementing prepositional phrases, so that Lakoff's re-emphasis of 'object' NPs (1970, pp. 164-5) did not solve the 'pseudopassive non-sentence' problem at all. The transformational derivation of manner adverbials from underlying sentences was certainly not new to Chomsky, who had suggested it himself, in Aspects (pp. 218-9); no reduction of descriptive power may have been entailed by Lakoff's elimination of one or two base rules, but there was, from Chomsky's point of view, a definite loss of 'explanatory' power. And since Lakoff's analysis enriched English grammar only to the extent of pointing out a few sets of related constructions in need of transformational formalization, the overall result may well have been a net loss.

The 'balance of power' among components of a grammatical description became the major bone of contention in the lexicalist-transformationalist controversy which was just taking shape at the time Lakoff wrote his critique of Aspects. As Chomsky later pointed out:

> A grammar is a tightly organized system; . . . certain descriptive problems can be handled by enriching the lexicon and simplifying the categorial component of the base, or conversely; or by simplifying the base at the cost of greater complexity of transformations, or conversely . . . We have no a priori insight into the 'trading relation' between the various parts. (1970, p. 185)

What is important, from the point of view of the present work on voice, is that there was never any doubt, in the transformationalist camp, that the active-passive relation was of necessity transformational in nature; as theoretical goals and methods of description diverged more and more from the Chomskyan tradition, the passive and other basic transformations were reformulated to suit the increasingly abstract analyses that were being devised, but it did not occur to anyone except quite recently that passives might better be derived non-transformationally. These later developments are discussed further below and in Chapter Five.

While the Aspects version of the passive transformation assigned definite constituent structure within VPs to agentive by-phrases, the be...-ed auxiliary was still somewhat arbitrarily being inserted by transformation into underlying P-markers. No particular reason was given, but it may have been simply that the old kernel- vs. derived structure distinction of the 1957 theory was being preserved, until there was cogent reason for doing otherwise. Lees apparently saw the transformational insertion of meaningful items as something of an anomaly, and he devised a simple remedy: generate both _be_...-_ed_ and agentive _by_-phrase interdependently, in deep structure, then simply permute the appropriate nominals transformationally, without creating any new structure (1964, pp. 30, 39). Context-sensitive constituent structure, however, was giving way at the time to context-free rewrite rules and context-sensitive lexical insertion, in mainstream linguistics (Chomsky, 1965, Ch. 2), and so Lees' otherwise sensible proposal was generally ignored.

In an early revisionist paper of the Chomskyan post-_Aspects_ period, Hasegawa (1968) also concerned himself with the problem of assigning the 'correct' constituent structure to the _be_...-_ed_ auxiliary and the agentive _by_-phrase, in passives, and he too suggested generating these constituents directly in deep structure, rather than deriving them transformationally. He noticed, however, that the permutation performed by the thus reduced passivization rule bore some similarity to one which derived verb complements from underlying embedded sentences. As a means of effecting descriptive economy, therefore, he proposed the reanalysis of passives "as a special case of the verb complement construction" (p. 230): just as 'John started singing' and 'John saw Bill leave' are derivable from deep structures containing, respectively,

John--PAST--start--ing #-John--PAST--sing-#

John--PAST--see--Bill--null #-Bill--PAST--leave-#

Hasegawa claimed, passives such as 'John was seen by Bill' could be derived from similar Verb--Complementizer -- #-Sentence-# structures, i.e.:

John--PAST--be--en #-Bill--PAST--see--John--by--D-#

Besides neatly distinguishing 'statal' passives (as instances of a perfective be #-PRED-# structure rather than be--en #-S-#), from 'true' passives, this analysis prompted Hasegawa to dispense with the special subject-object inversion rule -- all that was left of the classical passive transformation -- and to let the work be done by "independently motivated" elementary operations of 'quite general scope.' These were: agentive dummy replacement (also used in deriving 'action' nominalizations), complementizer movement (to the tense node of the embedded sentence), and equi-NP deletion. The descriptive economy procured by this reanalysis was, however, quite illusory: the simplicity it achieved was not as great as Hasegawa seemed to think, and it was purchased at the cost of increased complexity elsewhere in the system. The need for some kind of passive transformation was not done away with at all, for the be--en #-S-# type of verb complement always required at least one more operation -- agent movement --

than the other types (assuming that the embedded #-S-# contained a dummy agentive by-phrase, something not guaranteed by context-free rewrite rules). The complementizer-movement rule, furthermore, was inordinately complex, due to the profusion of verb complement construction types and their various co-occurrence restrictions (be/get V+ed; try to Verb; quit V+ing; see/hear NP V; ask NP to #-S-#; to name but a few), and the way it was formulated contradicted Hasegawa's own plea for single-operation transformation rules (pp. 238-42).

As a means of generating representations of passive constructions, Lees' (1964) grammar was simpler and, in a sense, a better mirror of native speaker intuitions than Hasegawa's economy-oriented analysis. Both these proposals seem important, however, and not so much for the descriptive parsimony they achieved, which was negligible, in any case, but for the implicit thesis that individual aspects of the well-known active-passive correlation are descriptively dissociable one from another. But that too is an illusion: one is tempted to infer a teleology between the way in which the formal representations of agency, 'victimhood,' and 'eventhood' were descriptively disconnected, and the fact that these notions can be more or less independently analyzed and communicated in speech, but that was an idea whose time had not yet come. 'Mirroring the behavior of the speaker' had not been in vogue since the late 1950's, and, although much was made of the conceit that grammars embody the analytic intuitions of native speakers, they invariably began as descriptive synopses of the distributional properties of linguistic constructions, not of speakers' cognitive organization. Any intuitive assent that was given to a grammar was thus to the apparent logicality of the distributional analysis, and had little if anything to do with everyday language-user competence. Besides, the formal dissociation in grammar of 'victim' subjects, be...-ed aspect, and agentive by-phrases was only apparent, for the label 'passive' continued by deliberate design to be applied only to those linguistic constructions in which all three co-occurred; descriptive parsimony, as always, demanded the co-generation of the be...-ed and by + AG constituents, and the transformational inversion, in one guise or another, of subject and object nominals.

It was only a first step, and taken for purely descriptive reasons, but the dissociation hypothesis may still have been the most realistic approach to the problem of grammatical voice. What Hasegawa seemed to be attempting to do, in his formalistic way, was to view the voice phenomenon not as something unitary and unique in language, but as one possible convergence of separate linguistic processes of otherwise independent meaning. Chomsky (1971, p. 212, fn. [b]) did not agree that the surface subjects of passives ought to be the same as their deep subjects, but the emphasis on deep-structural co-occurrence possibilities at the expense of transformational relations was consonant with the post-Aspects trend towards 'lexicalism' in Chomskyan theory, a trend which became a theoretical Standpunkt in Chomsky's 1970 essay on nominal phrases. The main point of that disquisition was that there is in English, in addition to the familiar transformationally-generated 'gerundive' nominal construction, a sizable class of 'derived' nominals whose internal structure mirrors that of sentences, in that they can be similarly generated in deep structure and can undergo some of the same transformations, including passivization. Nominals like 'John's refusal of the offer,' in other words, exhibit meaningful properties which superficially similar constructions such as 'John's refusing the offer' do not; both must therefore be descriptively derived in such manner as will account for these differences in their interpretation (see also Chomsky, 1972, pp. 90-92).

Derived nominals have both nominal and quasi-verbal properties, in that they may not only pluralize, and be preceded by adjectives and determiners, but, like passive participles, may be followed by an agentive by-phrase. One can say, for example:

(a) John's adamant refusal of the offer

(b) John's refusals of the offer

(c) that refusal of the offer

(d) the refusal of the offer by John

but not (e) * John's adamant refusing the offer

(f) * John's refusings the offer

(g) * that refusing the offer

or (h) * the refusing the offer by John.

Since derived and gerundive nominals -- as well as full-fledged POSS--ing nominalizations (such as 'John's [adamant] refusing of the offer') -- all arise from NP constituents with sentential structure, the differences in co-occurrence privilege among 'refusal' and the two slightly different uses of 'refusing' are seen as matters of 'deep' vs. 'acquired' lexical properties. Thus, 'refusal' arises non-transformationally from a nominal deep-structure feature complex like [+N, refuse], and has 'inherent' passivizability requiring reformulation of the passive rule; 'refusing,' however, is inherently a verb, with nominal properties by accretion only, and hence arises transformationally (in one of two ways) from a configuration like [+V, refuse].

That phrase (d) above exemplifies passivization is somewhat surprising, at first, since tradition has always restricted discussions of voice to verbal constructions, and for what were considered to be sound reasons. In generative-transformational theory, therefore, it became the custom to derive such phrases as (d) as nominalizations of passivized sentential deep structures (i.e., in this case, that which underlies 'The offer was refused by John'); what Chomsky was now suggesting, apparently, was a reversal of the procedure, i.e., that such phrases are really the passivization of a nominal whose underlying structure is basically predicative. Such a view was not possible until late-1960's explorations into the more recondite potentialities of generative-transformational description (e.g., Bach, 1967, 1968) suggested that lexical categories such as noun, verb, and adjective could be treated as only superficially different, and that focusing on their 'deeper' syntactic properties as logical predicates or 'contentives' permitted analyses of a simpler and yet far more powerful sort. Chomsky's lexicalist treatment of these abstract categories (1970, p. 199; 1972, pp. 91-2) was diametrically opposed to that of the base-rule minimizing 'transformationalist' school; both, however, were presumably concerned with devising the optimal language-description system, and the results may indeed be, as Chomsky (1971) has suggested, mere "notational variants" of one another.

In considering passivization in nominal phrases, Chomsky did note (1970, p. 203) that the process has historically applied only to verbs. But when the Katz-Postal-Chomsky analysis summarized in Aspects made the voice transformation hinge on the dummy agentive by-phrase, rather than the type of verb, the way was left open for virtually any lexical item to occur in the verb slot, as long as it was one which could legitimately co-occur with an agentive by-phrase. The advantage gained from this analysis at first was an extension of the passive transformation to include 'pseudopassives' such as 'John was laughed at by everyone,' as well as the usual transitive verb constructions. But once nouns and verbs were seen to differ only in their superficial features, not in their basic syntactic behavior, and once it could be assumed that "the complements of nouns are the same in principle as those of verbs, [one could] expect to find in deep structures complex noun phrases of the form *Det* - *N* - *NP* - *by* Δ, [such as, for example] *the enemy's* - [*destroy*, +N] - *the city* - *by* Δ" (Chomsky, 1970, pp. 203-4). "Agent-postposing, . . . a generalization of one of the components of the [reduced *Aspects*-type] passive transformation . . . will then apply, as in the passive, giving *the destruction of the city by the enemy*." Assuming that the usual passive agent deletion rule may apply, NP-preposing, which "is similar to, and may fall under a generalization of, the other component" of the passive transformation, may also apply in this case, yielding *the city's destruction* (*by the enemy*) (*ibid*.).

The point to notice, in this fascinating analysis, is that passivization in nominal phrases is accomplished through agent-postposing alone, which leaves the pivotal noun in the focused 'subject' position; NP-preposing serves optionally to front-shift the 'object' noun to that position of attention. And there need not be an 'object' noun at all, in noun-phrase passivization, as, for example, 'the refusal by/of John (to leave).' The crucial role played by implicit agency in the description of actives and passives comes once again to the fore, as does the basic independence of the two components of subject-object inversion. Chomsky had little to say about the traditional passive transformation in his 1970 paper, except that it is "an amalgam of two steps" (p. 203); until the generalizability of the NP-preposing part of the rule is made more clear, there is perhaps nothing further that can be said, from the standpoint of formal description. It is clear, however, that Chomsky's analysis was superior to Hasegawa's: by extending the domain of agent-object inversion to predicative noun phrases as well as sentences, the two component operations were preserved virtually intact, though independent, and no counterintuitive reanalysis of passive deep structure was required.

The further formal development of the passive transformation itself in Chomskyan theory has been slight, but the overall theoretical structure in which it operates has undergone such a reorientation since the late 1960's that there is only a superficial resemblance between the 'standard' theory presented in Aspects and the present 'extended standard theory' (EST) outlined in Chomsky (1970, 1971, 1972, 1973). Having defused most of Lakoff's (1970) 'exception' arguments in advance in Aspects (1965, pp. 217-9, nn. 27, 28), Chomsky turned his attention (1973, p. 236) to one of Lakoff's more significant criticisms of the 'standard' passive rule, i.e., the fact that its ambiguous deep-structure analysis of intransitive-verb-cum-prepositional-phrase constructions failed to distinguish those which legitimately pseudopassivize from those which do not.

Chomsky's remedy was no solution, however, for it answered few real questions satisfactorily and raised many more. In order for the passive rule to generate pseudopassives correctly, Chomsky noted, the 'structural condition'

X, NP, V*Y*, NP, *Z*

("overlooking auxiliaries, the agent phrase, and the composite nature of the rule discussed in Chomsky (1970a)," and something of a departure from the V-...-NP notation of the *Aspects* version [p. 104]) had to be restricted to those 'factorizations' of deep structure in which the 'factor' corresponding to 'V*Y*' was a "semantic unit" (Chomsky, 1973, p. 236). That is, *live-in*, *argue-about*, *give-in-to*, and the like must be considered unitary 'factors,' as in:

(a) England was lived in by many people.

(b) The plan was argued about all day.

(c) The brat insists on being given in to.

Die in, on the other hand, must not, in view of:

(d) *England was died in by many people.

Remain in, *dash into*, and the like are also presumably excluded (Lakoff, 1970, pp. 164-5; see pp. 58ff., above). Toward this end, Chomsky recommended a general condition on all transformations such that:

> Each factor imposed by a transformation either is a morphological or semantic unit or corresponds to a variable in the structural condition of the transformation. (1973, p. 236)

"This condition," Chomsky went on, "... permits Passive to be formulated with the structural condition [*X*, NP, V*Y*, NP, *Z*], constraining the application of the rule properly in quite a range of cases" (*ibid*.). In view of the current vogue for "solutions to problems" rather than "devices that work" in generative-transformational theory (Anderson & Kiparsky, 1973, p. *v*), one almost hesitates to ask *how*. If *live-in* has a semantic 'reading' "in the sense of Katz [1966] and others," thus qualifying both as a "semantic unit" and "single nonterminal" at some stage of a derivation, the terms 'V*Y*, NP' will supposedly 'factor' the underlying sequence 'live in England' into [*live-in*] [England], where *live-in* is V and *Y* is null, but factor the sequence 'die in England' into something like [die] [in] [England], where *Y* applies to the preposition *in*. The formal derivation process in this case depends heavily on 'live in' having such an amalgamated reading in the appropriate context -- one which the 'live in' of 'We really lived, in England' should not, as Chomsky noted (*ibid*.) -- but even more on the output of partial semantic amalgamation being available to an early cyclic syntactic transformation in a non-algorithmic, non-directional, and timeless automaton. Unless, of course, the construction of descriptive automata is no longer the point, in linguistics. It would certainly seem so, for the need for sentient human intervention in the operation of what was supposed to be an explicit system that made no appeal to any user's *faculté de langage* has increased to such an extent since 1957 that all of generative-transformational theory is considered in some quarters to have been seriously weakened:

> . . . for the interpretivists, special rules of interpretation of relatively unrestricted form and with unlimited possibilities for interaction with other parts of the grammar; for the generativists, special kinds of abstract underlying structure, ad hoc transformations, and constraints on derivations of practically unlimited power . . . In other words, I believe we are in a theoretical impasse . . . (Bach, 1974, p. 225)

Or is it perhaps that language is not describable as a rigid system, after all? The current flood of rules that do not generate and formal constraints that do not constrain purports to be a loosening of the Procrustean bed, but in reality amounts to no more than a return to pre-structuralist philosophizing, with the lingering myth of 'proven' generative-transformational predictiveness to lend it modern authority. For the fundamental fallacy of transformationalism remains a fallacy, irrespective of the persuasiveness of each theoretical reformulation in turn, or the "consistency of the conclusions that it leads to" (McCawley, 1974, p. 187): the Chomskyans now pretend to describe competence directly, in their speculative elaborations of 'innate ideas', and the generative semanticists simply ignore competence as a "dead issue" (ibid., p. 185), and get on with the task of building more powerful logicosemantic rule systems. But both, to a great extent, are still 'playing mathematical games' (Steinberg, 1975), because both, like it or not, are still basically in the business of enumerating symbolic representations of potentially well-formed messages, with what they consider to be maximum descriptive efficiency. Whatever their 'intra-paradigmatic' differences may be (Botha, 1973), interpretivists and generativists alike subscribe to the same epistemological methods, and resort to the same specious argument forms; any relation between their grammars and the linguistic cognitions of memory-equipped language users is thus purely a matter of philoscphical conjecture, as impervious to rational proof as to disproof.

As difficult as it is, to derive from Chomsky's theory of language structure any empirically testable hypotheses about language use, it is still probably the most likely source. Chomsky's attempts to come to grips with human linguistic competence at least give an inkling as to what speakers' cognitions of sentence structure are thought to be like, including his recent speculations about general constraints on transformations, and the relevance these constraints might have to what Bever has called 'perceptual strategies' (Chomsky, 1973, pp. 270, 275). Generative semantics, however, with its almost total preoccupation with the abstract internal logic of language as it operates in vacuo, does not appear to have much relevance to research in linguistic behavior: there is a pervasive sterility to generative-semantic discussions, as if language were nothing but a system of non-directional mappings of one abstract formal object ontc another, and little attention is given to meaning except in its most atomistic representations.

Although generative semanticists' formulations of the passive transformation have changed, in order to accommodate their "increasingly abstract" and "embarrassingly deep" conceptions of underlying syntactosemantic structure (Bach, 1968), their fundamental attitude towards voice itself has remained much the same. Bach (1967) was among the first to suggest that the passive participle was part of a postverbal 'Predicate' constituent, rather than incorporated into the main verb phrase; in this early antilexicalist paper, he claimed that have and be, both as semantically empty 'linking elements' and as main verbs, could be transformationally predicted in, from subject-object identity and tense combinations in matrix vs. embedded sentences, and hence need not be generated in ad hoc fashion by Base rules. His passive transformation then postposed the embedded subject (i.e., agent) NP, as one might expect, and then equi-deleted the the superfluous embedded object. Why the structure underlying even simple passive and active sentences had to be complexes of embedded sentences in the first place, however, had more to do with a supposedly universal set of base rules and with the ease of generating reduced relative clauses than with grammatical voice as such, and paid no allegiance whatever to native speaker intuition.

Langendoen (1969) used what amounted to two infinitely recursive base rules to generate highly complex deep structures reflecting the 'n-placed contentive predicate plus n arguments' view of the basic propositional content of all sentences (McCawley, 1971). Passivization then involved subjectivization of the most deeply-embedded NP bearing objective case marking (emulating Fillmore [1968]), and equi-deletion of its then superfluous duplicates. According to Robson (1972, p. 35), this amounted to a 'predicate-first' version of the Hasegawa (1968) treatment, but it actually foreshadowed Robson's and others' proposals to dispense with the passive transformation altogether and let independently-required T-rules do the derivational work. R. Lakoff (1971), too, espoused McCawley's predicate-and-arguments concept of deep structure, but not to the same extent as Langendoen, whose attempt to derive every surface noun from an underlying predicate nominal (cf. Bach, 1968) led to a proliferation of multiply-embedded one - WH - is - X clauses, with highly questionable gains in descriptive power (Reid, 1974a).

Like Hasegawa (1968), R. Lakoff (1971) preferred to formalize the agent-verb-object relations in passives as an embedded sentence complement to a main verb be, and she shared G. Lakoff's (1970) distaste for agentive manner adverbials; she neglected to specify, however, how a suitable passive transformation might be formulated, or failing that, how the required constituent movement and function-word placement ought otherwise to take place. It was absolutely clear, however, that she considered subject-object 'switching' and complement-sentence raising to be essential parts of the passivization process, and it is in these required manipulations of underlying subtrees that the crux of the matter lies: whether accomplished by means of a unitary, a bipartite, or a tripartite passive transformation, or by other structure-building and deletion rules, it continued to be taken for granted, by lexicalists and generative semanticists alike, that objects become subjects and subjects become agents in passives, and they continued to write their grammars accordingly. R. Lakoff thus failed to respond adequately to her own challenge, "Why passivize a sentence at all?" (1971, p. 149)

G. Lakoff was as imprecise as R. Lakoff concerning the derivation of passives, and perhaps even more so, but he apparently held the same basic assumptions: it is fairly clear, from his extended discussion of its interactions with other "local derivational constraints" (G. Lakoff, 1971, pp. 233ff.), that it is the same old subject-object inversion that he had in mind. There is not a word, however, as to how the rule serves to relate sound and meaning, nor of any variants or subtypes of the basic (full transitive active) --> (full agentive passive) relation. That there must be such a 'derivational constraint,' however, was never in doubt: however indistinct its formalization, Lakoff took its existence completely for granted, and it figured rather crucially in Lakovian arguments against Chomsky's concept of deep structure.

Case Grammar

One further view of voice, and of language in general, that deserves consideration here is the 'case grammar' approach first fully enunciated in Fillmore (1968) and elaborated in Stockwell, Schachter, & Partee (1973). Intended as an alternative to the standard Aspects theory of Chomsky, case grammar was predicated on "the distinction between surface syntactic relations such as subject and object (usually defined in a transformational grammar by means of dominance relations, cf. Chomsky 1965: 71), and certain semantically relevant 'deep' relations, between NPs and verbs" (Fletcher, 1971, p. 237). Because of subject-selection, objectivization, and other 'case-placement' rules, case grammar can account, with one base-generated set of case relations and a verb, for all sentences in which a given set of lexical units are similarly inter-related, for example:

(a) The door [OBJ] was opened with a key [INSTR].

(b) The door [OBJ] opened with a key [INSTR].

(c) A key [INSTR] opened the door [OBJ].

(d) A key [INSTR] was used to open the door [OBJ].

Since such sentences are not systematic paraphrases of one another in the usual sense, Chomskyan theory derives them from formally distinct deep structures, thus obscuring some rather significant common semantic content (Fillmore, 1968, pp. 25ff.; Fletcher, 1971, p. 240). It is an open question, however, whether any two non-identical sentences have the very same semantic interpretation, and so the extended version of case grammar (ECG) of Stockwell _et al_. (1973) is, like Chomsky's 'extended standard theory' (EST), constructed "as if it were true that the subtle semantic difference . . . did _not_ depend on deep structure, whether that is in fact true or not" (Stockwell _et al_., 1973, p. 35).

The case-grammar view of subject and object as derived, rather than as deep structural relations puts the voice phenomenon in quite a different light. There is no question in case grammar of one set of functional relations -- e.g., agent as subject, 'victim' as object -- being the basic, unmarked, most predictable state of affairs, and all others being somehow at variance with or derivable from it. Any nominal, it is assumed, can be the sentence subject, regardless of its semantic role in relation to the verb and other nominals; it is just that when certain case holders ('actants') are subjectivized, certain compensatory syntactic and morphological adjustments are required, in order for the sentence in question to be considered grammatical. As Stockwell _et al_. (1973) have put it:

> Since the prepositional marking of the constant relationships varies, depending on what item is subject or object, or whether there is nominalization or not, the rules must provide a means of holding the relationships constant while varying the prepositions (or deleting them) in regular and general ways. (p. 37)

The Stockwell _et al_. extension of Fillmore's original case grammar also incorporates Chomsky's (1970) lexicalist hypothesis, in that the cyclic transformation rules have NPs as their domain, as well as #-S-#'s. Passivization within (derived) nominals is thus accounted for, though the authors point out that "there is no obvious motivation to claim that nominals with by-phrases have undergone passivization unless the object has been moved to the front (genitivized)," as in 'the city's destruction by the enemy' (Stockwell *et al*., 1973, p. 42). Nevertheless, the ECG account closely parallels that of Chomsky (1970), and improves on it somewhat. Nominals like 'the destruction of the city by the enemy' are, in a way, partly passivized in Chomsky's EST, since they involve the agent-postposing part of the passive transformation, whose composite nature is never further elaborated (see Chomsky, 1970, p. 203; 1973, p. 236, n. 11). In the ECG, however, such nominals involve no case placement, but only lexicalization with by (unless the head noun requires or permits agency to be otherwise marked, as in 'the refusal *of* John to leave') of the 'inherent' preposition of the appropriate actant phrase. Passive subject placement (Chomsky's 'NP preposing') may then apply optionally, to generate the 'fully' passivized nominal mentioned above, and in fact may apply quite independently, in the ECG, to nominal deep structures containing a single objectivized actant, yielding, for example, 'Nixon's election,' 'the Queen's cousin,' and, presumably, the city's destruction' (Stockwell *et al*., 1973, pp. 58-9).

Where a verb is the head of a (sentential) deep structure, and it bears the optional feature [+PASS], both by-placement and passive subject placement must apply, in the ECG, optionally followed by passive agent deletion, as in classical generative-transformational theory. Since the ECG employs "the 'dummy symbol' variant of lexical insertion (Chomsky, 1965)" (Stockwell _et al_., 1973, p. 12), sentences such as:

(a) The city was destroyed by the enemy.

and (b) The city was destroyed.

presumably arise from base structures that differ only in the lexicalization of the agentive actant. 'Agentless' passivized nominals are also derived from different deep structures than are 'agentive' ones, but because _by_-placement and passive subject placement apply independently in ECG, no agent deletion is required; agentless nominals such as 'the city's destruction' arise from base structures in which the agentive actant is altogether lacking (_ibid_., p. 59).

There is a certain anomaly in the overall ECG view of voice, in that the passivization of sentential deep structures formally presupposes some sort of agency, and is firmly committed to the traditional subject-object inversion; passivization in nominals, however, requires neither, or certainly seems not to, although Stockwell _et al_. point to a lack of "independent justification for claiming that there has been passivization" unless both _by_-placement and passive subject placement have occurred (p. 42). Whether any phenomenon is an instance of passive depends, of course, on the prevailing definition of what a passive is; the doubt of Stockwell et al. is well-founded, given the longevity of the subject-object inversion concept, but as they obliquely suggest, there is a need for independent justification, either way. That is what the present study hopes to obtain.

What were referred to as 'pseudopassives' by Chomsky and others (see above) are accounted for in a rather natural way in ECG: if the actant destined to be surface object bears a lexically marked -- and hence non-deletable -- preposition as case marker (and in general it is the marked prepositions which occur in non-separable verb + preposition phrases that function as unit verbs), that preposition is treated as part of the verb rather than as the leading element of a postverbal prep-phrase. The grammar thus generates:

(a) The chairman [referred to] the proposal.

(b) The proposal [was referred to] by the chairman.

but not (c) *the proposal's referral to by the chairman

since the appropriate rule is defined only on domains where a V is head, and not an N (Stockwell et al., 1973, pp. 43, 52ff.). Because there is no single unmarked preposition for locative actants, the selection and deletability conditions are rather complex (ibid., pp. 39-41). Thus, it is not clear whether ECG will characterize the examples given by Chomsky and Lakoff (see above) as well-formed or not:

(d) ? England was lived in by many.

(e) ? England was died in by many.

(f) ? England was remained in by John.

(g) ? The room was dashed into by John.

In view of its many other attributes, this is hardly a serious gap in the range of phenomena accounted for by the ECG. Despite its non-formality and lack of real generativity, Chomsky's 'semantic unit' proposal (1973, p. 236) seems to be the best solution to date for these marginal cases.

An interesting further aspect of ECG is that actants whose case-relation to the verb is instrumental, dative, or 'neutral' may undergo passive by-placement, if there is no actant marked 'agent' in the case-frame. Thus:

(a) Germany's defeat by the Allies [AGT]

(b) the city's destruction by fire [INSTR]

in nominals, and:

(c) The guests were received by Mary [AGT].

(d) The package was received by Mary [DAT].

(e) My finger was burned by the match [INSTR].

(f) He was surprised by the news [NEUT].

In other words, ECG distinguishes between deep and surface agency, since other actants may function as the latter, in the absence of the former (Stockwell et al., 1973, pp. 41-2, 58). In the Chomskyan EST, the above examples could be derived only from deep structures in which the NPs in question occupied the leftmost 'deep subject' (i.e., agent) position, dominated only by S.

CHAPTER THREE

EMPIRICAL INVESTIGATIONS OF VOICE

Compared to the grammatical history of voice, which spans some twenty centuries, its history as the subject of empirical research is mercifully short -- twenty years, at most. While psycholinguistics as a distinct field of inquiry may fairly be said to have first come into existence in 1951 (see Osgood & Sebeok, 1954), little attention was paid to the syntax of language as a cognitive entity until the advent of generative-transformational grammar in 1957. Or rather, until Noam Chomsky started making psychological claims concerning the intuitive reality of generative rules (e.g., 1959, pp. 56-7), and G. A. Miller started testing these claims experimentally (Miller, 1962). The testing of psycholinguistic hypotheses concerning human linguistic competence will not, however, be discussed at this point, in the present work; as a bridge between grammarians' speculative philosophizing about voice and empirical research into its behavioral correlates, there follows a review of the first and perhaps only attempt to correlate grammatical descriptions of active and passive constructions and their patterns of occurrence in actual language use.

Svartvik's Taxonomy

In Svartvik's own modest estimation, his study *On Voice in the English Verb* was a "corpus-based discussion of some grammatical categories that seem relevant to problems connected with voice in English" (1966, p. *vii*). Particular attention is paid to it here for two reasons: besides being one of the few serious attempts by a linguist to test the descriptive adequacy of a transformational rule by other than introspective means (*ibid*., p. 6), it is probably the most detailed distributional analysis of English passive construction subtypes in existence, and it is based on a corpus large enough to make it authoritative. Completed just at the time when the *Syntactic Structures* theory of Chomsky was developing into the *Aspects* version, Svartvik's analysis uncovered some prevalences of occurrence which contradicted the black vs. white dichotomy of sentence types which generative-transformational descriptions inevitably imply, and suggested instead a graded multivariate scale of 'passiveness' more nearly consonant with ordinary intuition.

At one extreme, Svartvik found a high degree of correspondence between active and passive transitives, with the passive transformation a viable description of the formal relations between types. At the other extreme, however, he found passive participles to function more like postcopular attributives than like transitive verbs, and hence more closely related to intransitive *be* -- *Complement* structures than to any underlying active sentence, in the usual sense (p. 166).

Although Svartvik's treatise was nominally about voice, it concerned itself predominantly with the passive. Part of the reason, at least, was that there was at the time "no exhaustive treatment of the passive in present-day English," nor even any "agreement among grammarians as to what constitutes an English passive" (1966, p. 3); ample evidence that this was so has been presented in Chapter 2 of the present thesis. In order to remedy these situations, Svartvik's analysis had to include practically every type of construction ever labeled as 'passive' by a grammarian, "not only central constructions, but also those on the periphery" (p. 4). What was common to all definitions of a passive construction was the presence of a form of be ("or auxiliaries commutable with be") and a past participle; this, therefore, was chosen as the "simple working definition," the formal criterion by which clauses would be initially selected for analysis (pp. 3-4, 85-86, 92-93).

As far as Svartvik was concerned, passiveness inhered -- *à la* Halliday (1964) -- "only in the verbal group, not at clause rank" (Svartvik, 1966, p. 5); all kinds of predicative expressions were thus taken to be passive constructions, including what were known to the more liberal of the traditional grammarians as 'actional' passives, 'statal' passives, 'passives of occurrence,' 'adjectival' or 'attributive' passives, and so on, e.g.:

(a) The house was built by experts.

(b) The house was built of wood.

(c) His bills are paid.

(d) His bills are paid regularly every month.

(e) His bills are paid, so he owes nothing now.

(f) The snow was piled high by the wind.

(g) The snow was piled high by the door.

(h) The village was (appeared, lay, looked, seemed) quite deserted.

(i) He felt thoroughly disappointed.

(j) The door remained locked.

(Svartvik, 1966, p. 4). Against the possible charge that what he was classifying were occurrences of the 'be -- V+ed' construction, rather than instances of the passive, Svartvik pointed out that the term 'passive' has been applied "indiscriminately to notional and formal categories alike, or . . . used loosely with reference to languages with different voice systems;" the value of his unorthodox definition would in any case "emerge from the discussion" (1966, pp. 4-5, n. 13). Grammatical constructs invented for descriptive or pedagogical purposes are, after all, just what grammarians say they are, no more, no less.

A science as primitive and exploratory as the study of language in use is, however, ill-served by data admissibility criteria that are too slavishly geared to the descriptive system currently in vogue. Grammarians, Svartvik suggested (pp. 19-24, 95, 137-8), have virtually ignored all but the tip of the iceberg, as far as potential passives are concerned: besides the usual '*V+ed*' verb forms (e.g., 'taken,' 'finished'), there are 'phrasal' and 'prepositional' verbs ('looked up,' 'looked upon,' 'got away with') and '*X*-*V+ed*' compounds ('widespread,' 'well-judged,' 'man-made,' 'unfrequented,' 'self-appointed,' 'all-admired'), and all of these can function, within limits, as lexical verbs in verbal groups with *be*. Even noun-based -*ed* constructions ('diseased,' 'jaundiced,' 'red-haired,' 'downhearted,' 'hunchbacked,' 'one-eyed,' 'unskilled,' 'self-willed') share this verbal property to some extent. Because they do not have all the privileges of occurrence of 'true' lexical verbs, these forms are admittedly less central, but their relation to the voice system as a whole cannot be ignored, for some which analyze as *X*+(*V+ed*) rather than (*X*+*V*)+*ed* can have agentive adjuncts, as does 'ill-served' in the first sentence of the present paragraph. Some steps have been taken, since Svartvik's study was completed, to extend the transformational analysis of voice to 'phrasal' and 'prepositional' verbs, but no further, and even those proposals which have been made are somewhat lacking in adequacy (Chomsky, 1965, 1973; Lakoff, 1970; see discussion in Chapter 2, above).

Svartvik's 323,000-word corpus comprised 28 continuous texts, representing 13 genres of language use; two of the genres were unscripted spoken English, accounting for about 40,000 words. The analyses, as Svartvik himself noted, were "'linguistically sophisticated' but 'computationally trivial,'" in that the entire corpus had to be grammatically pre-analyzed 'by eyeball;' the eight principal characteristics of each clause (type of clause, type of finite verbal group, order of clause elements, etc.) were encoded on tape and input to a computer, which then sifted, correlated, and tabulated these intuitive data (pp. 39-42). Numerous results were arrived at, "of which a few seem significant, some suggestive, and many trivial . . . It may be worth emphasizing, however, that the difference between trivial and non-trivial results is far from obvious" (p. 69). What is trivial to one reader, furthermore, may well command the attention of another.

The most important outcome of Svartvik's work, from the point of view of the present thesis, is that his basic grammatical assumptions -- or rather, the lack of them -- made it conceptually possible to disengage the various syntactic concomitants of voice from one another and to view them, initially at least, as independent events. Any dependencies which did emerge were then the result of verifiable co-occurrence, not a priori assumption, and amenable to some statistical significance testing. Thus, for example, Svartvik's finding of a greater relative frequency of be -- V+ed constructions in scientific writing than in fiction was not exactly surprising, but his ability to associate with his observed frequency distribution (32/68 percent split vs. 06/94 percent, roughly) a probability of chance occurrence less than 0.1 percent lent his inferences considerably more weight and credibility than they would otherwise have had (p. 46).

Svartvik's main preliminary findings, as far as sentence subjects, verb phrases, and postverbal adjuncts were concerned, were as follows:

(a) passive subjects were predominantly inanimate, and not only in the scientific texts, where passives were more prevalent to begin with ($p < 10^{-45}$)[*sic*]; agentful passive clauses tended to have longer subjects than agentless ones (pp. 50ff.).

(b) although *be* -- *V+ed* verbal groups were much less frequent, overall, than active ones, the subtypes of each were similarly distributed in that the simpler ones in word count were more frequent than the more complex; the most complex verb phrase types (i.e., may/might have been *V+ing*; may/might be being *V+ed*; has/had been being *V+ed*; may/might have been being *V+ed*) did not occur at all, in the texts under analysis (pp. 43-49).

(c) passive clauses tended to have either a nominal or adjectival complement, *or* an adjunct (prepositional phrase, in most cases), postverbally, and relatively infrequently had both; there seemed to be a compensatory effect between agentful and agentless passives, in that the latter, lacking agentive *by*-phrases, tended to have non-agentive adjuncts to a

> greater degree (95 per cent vs. 62 per cent) than the former, which by definition had at least an agentive adjunct phrase; passive agents tended to be inanimate and nominal, rather than pronominal, and "much longer" in word count than the subjects of passive clauses (pp. 51-65).

Svartvik also noticed that agentful passives, like active clauses, were syntactically 'free' in 50 per cent of cases, i.e., neither syntactically bound nor sequentially related to another clause (p. 67). Agentless passives, on the other hand, were syntactically free less than three-tenths of the time, and there were some interesting instances of sequentially related 'V+ed' constructions occurring as conjuncts of adjectival complements after an amphibolous be, for example (pp. 81, 96):

(d) He's only six; and not allowed to play with rough children.

(e) The other side was broken, hillocky, and patched.

These distributional findings were largely corroborated in Svartvik's second 'experiment,' a hierarchical cluster analysis of 128 passive clauses which had been "proportionately, and randomly, selected from six groups into which the material had been provisionally ordered on subjective grounds" (p. 73). Each clause was exhaustively described in terms of 108 different criteria relating to various subjective and objective properties of the clause as a whole, its subject, its verbal group, and complements and adjuncts, if any (pp. 73-110). The purpose of the analysis was to let the correlations among the 108 descriptors be the determinants of inter-clause similarity, and hence of the kind and number of 'natural' classes of objects represented in the data; the rigorous techniques of numerical taxonomy would thus serve as a check on intuitive classifications according to syntactic and semantic criteria. More than half the clauses (55 per cent) were culled from the passive-rich 'learned science' texts, but 17 per cent were taken from impromptu television discussions; the rest came from novels.

The 128 data vectors, each representing a randomly selected passive clause, were found to be of six major types, some of which corresponded closely to intuitive passive clause classifications (pp. 115-28). The groups of vectors, furthermore, were found to have "a small number of individual characteristics (key features), which defined all, or almost all, the members of the groups" (p. 132). The clauses which comprised each group, as determined by the numerical taxonomy procedures, may be described as follows, in terms of those 'key features:'

Group I (n = 19): agentful, with inanimate by-agent sometimes interpretable as a non-agentive adjunct; transformable to active voice directly or through animate agentive by-extension, depending on interpretation; most typical member: 'the phenolic esters ... are easily removed by hydrolysis ...'

Group II (n = 12): agentful, with animate by-agent; directly transformable to active: 'the first investigations ... were made by Goldschmidt ...'

Group III (n = 53): agentless but agentive, with animate agency implied; non-agentive postverbal adjunct present; directly transformable to active, after by-extension: 'The baby was installed in the old nursery.'

Group IV (n = 17): agentless but agentive, with animate agency implied; syntactically bound clauses, with no postverbal adjunct; directly transformable to active, after by-extension: 'If it were introduced, ...'

Group V (n = 6): agentless, but potentially quasi-agentive through extension, not necessarily animate, and not necessarily with by; dually transformable to 'extensive' or 'intensive' active clauses; other 'passive' auxiliaries used, as well as be; participles permit qualification and conjunction with adjectives: 'He became excited.'

Group VI (n = 21): agentless; non-agentivizable; no corresponding active clause; participles permit qualification and conjunction with adjectives: 'The vascular membranes of the brain are highly developed in lampreys ...'

Most of the passive clauses -- Groups I - IV -- though not necessarily 'agentful,' were at least 'agentive,' with clearly implied agency; of these, Groups III and IV, the 'agentless' agentives, accounted for more than half of the corpus under analysis. Subjectively as well as objectively, in terms of the within- and between-group similarity coefficients (pp. 115-6), the taxonomic groups were found to "conform most closely to a cline distribution, i.e., clusters which are serially related in a continuum." The most salient characteristic of this continuum, to a descriptive linguist like Svartvik, was that it constituted a gradient of potential active transformation, with unequivocal 1:1 correspondence between passive transitive clauses and their active counterparts at the 'agentful animate' end of the scale, and nothing but "syntagmatic affinity with active equative clauses" at the other (p. 138). In between the two extremes lay various degrees of equivocality, ranging from the partial ambiguity of the 'Janus agents' in Group I through the indeterminacy of concocted quasi-agents in Group V. The differences among passive clause types thus seemed in many ways to be a matter of degree, rather than a matter of kind.

The six-way classification system eventually devised by Svartvik was based largely, but not slavishly, on the taxonomic facts which were found to obtain among the clauses in the rather limited passive corpus. Criteria were modeled on the key descriptive features in accordance with their apparent predictiveness and their practical applicability, but also with an eye to preserving the complex multivariate cline relationship that appeared to hold among passive constructions. Thus, classes _alpha_ and _beta_, at the 'top' end of the scale, comprised passives with overt animate _by_-agents and overt unambiguous inanimate _by_-agents, respectively, corresponding to Group II and the unequivocal members of Group I, in the taxonomic analysis. Class _gamma_, "the central and most frequent passive clause class" (p. 134), comprised taxonomic Groups III and IV, and included agentless clauses with potential 'direct' _by_-agent extension, usually animate, and subsequent systematic active transformation "within the same tense" (_ibid_.). Syntactically bound clause relations and the absence of postverbal adjuncts -- the main features distinguishing Group IV from all others -- were thought to mark a functionally important subclass of class _gamma_, but not a separate class. 'Janus agents,' however, i.e., _by_-phrases interpretable either as inanimate agents or as instrumental adverbials, marked clauses as members of class _beta_ under the first interpretation, but as members of class _gamma_ under the other; rather than introduce ambiguity into either class, Svartvik opted for an intermediate _beta/gamma_ class (p. 133). These ambivalent constructions were later found to constitute over one-fifth of all inanimate _by_-agents (p. 142).

In addition to its main characteristic as a 'transformability to active' continuum, Svartvik's passive scale also incorporated a verbal-adjectival gradient.

Clauses with unequivocally verbal _be_ -- _V+ed_ phrases were unequivocally transformable, and those with strictly adjectival occurrences of _V+ed_ had no corresponding active at all. Intermediate between these were the ambivalent passives, transformable into extensive or intensive actives, depending on verbal or adjectival interpretation of the _V+ed_ participle, and on animate or inanimate quasi-agent extension: 'she was astonished,' for example, can be variously related to 'someone/something astonished her' or 'someone/something made her (feel) astonished.' The need for discourse context, in order to resolve the many implicit ambivalences in language, receives further emphasis from this finding. Svartvik's class _delta_ included all such clauses, with 'attitudinal' passives (e.g. 'John felt compelled to go') as a distinguishable subclass alongside the mostly 'emotive' passives of taxonomic Group V.

The non-agentive passives of Group VI were assigned to class _epsilon_, as were statal passives, which admit of agentive extension and activization, but only indirectly, with a change of tense (e.g., 'the job is finished'). The sixth class, _zeta_, comprised all quasi-_V+ed_ compounds: though "morphologically isolated, they are not necessarily syntactically isolated with regard to voice, in so far as they may occasionally have agents" (e.g., 'Cavill was unimpressed by this sally,' p. 137). These uses of '_be_ -- _V+ed_' were the most adjectival, hence the least 'passive' of them all, and thus stood at the 'lower' extremity of

Svartvik's passive scale, and somewhat marginally related to it.

Application of the derived criteria to all 28 texts of the 323,000-word corpus yielded the relative frequency figures already mentioned above, and a number of other facts, besides. Despite Svartvik's liberal definition of a passive construction, the be -- V+ed clause type remained in the minority: even in passive-rich scientific exposition material, the proportion of passives to actives never exceeded 1:3 (pp. 164-5). Within the minority voice, agentive passives predominated, comprising "almost three quarters of all collected passive clauses" (p. 141); eighteen percent of the passives were non-agentive, with agentive extension "unlikely or impossible" (p. 148), and the rest were 'quasi-agentive' (see class delta, above). Agentful agentives, however, were relatively infrequent, amounting to "only some 20 percent of agentive clauses and less than 15 percent of all passive occurrences" (p. 164). Eighty-eight percent of the agentful passives, in turn, were of the classical 'passive transitive' (i.e., NP--Aux-be-V+ed--by-NP) clause type (p. 143).

There can be little doubt that agency, expressed or implied, is closely correlated with the use of passive syntax; it is by no means the only concomitant of past-participle predication, however, and the fact that it is left unexpressed in 85 percent of cases leads one to question the crucial role assigned to it in the past by grammarians. If there is a single summary conclusion to be drawn from Svartvik's findings, it is that linguistic theory should abandon its "rigid, unrealistic, and arbitrary dichotomy [of sentences] into 'passive' and 'nonpassive'" (p. 162): voice is a multivariate phenomenon, a convergence -- or rather, a finely graded series of convergences -- of many inter-correlated syntactic and semantic factors, among which the dependency relationships are at best obscure. Thus, the purposes of language description are perhaps not best served by a system which is wholly dependent on a bivariate logic: the passive transformation, which by its very nature dichotomizes the set of all possible derivations -- and hence the set of all describable sentences -- seems to bear little if any relevance to even the distributional facts of language use, let alone any of its cognitive processes.

One of the many voice-related factors which has generally been overlooked is what Svartvik called "the requirements of balance between clause elements" (p. 156). He attached some importance to the fact that passive agents in his corpus material were on the average twice as long in words as were subject phrases: unlike subjects, agent nominals were frequently co-ordinate, but were rarely "expounded by personal pronouns . . . Hence, we may conclude that one of the motivating factors in selecting the passive in favour of the active is the preference for placing heavy nominal groups at the end of sentences" (p. 157). In addition to the complex patterns of purely formal correspondence (or the lack thereof) between subtypes of the active and passive sentence classes, in other words, there is further evidence to vitiate the neat dichotomy implied by the passive transformation in the fact that one member of a supposed opposition may be stylistically awkward, and much less likely to occur than the other, for example:

(a) I saw (washed, bought) a nice little blue car.

versus

(b) A nice little blue car was seen (washed, bought) by me.

but

(c) This provisional definition was also favoured by Dewey, who pointed out etc. etc.

versus its active counterpart (Svartvik, 1966, p. 166).

A similar imbalance of occurrence seems to hold in use between formal verb-phrase counterparts, with stylistic restrictions falling mainly on the more complex -- i.e., the passive -- member:

(a) The Conservatives have not been winning seats lately.

seems quite acceptable, whereas:

(b) Seats have not been being won by the Conservatives lately.

would probably strike most people as clumsy or pedantic (ibid., p. 165). Given any particular collection of ideas to be conveyed, and the length and complexity of constituents required to do so, in other words, there is probably little freedom of choice between the active and the passive voice. One is generally preferred to the other, and may indeed be obligatory, not only to avoid stylistic imbalance but also to preserve the normal theme-rheme sequence within sentences in discourse (Svartvik, 1966, p. 166; see also Hinds, 1975).

The multifarious restrictions on the occurrence of certain actives and passives led Svartvik to wonder whether clauses in the 'lower' portion of the passive scale were not better accounted for by a 'serial' relation than by a transformational rule. "Sentences can be produced paradigmatically," Svartvik thought (p. 159), citing Quirk (1965, p. 213): ". . . the production of sentences proceeds by a complex interplay involving 'transformation' and what Miller calls 'a sentence-frame manufacturing device." "Generally speaking," Svartvik continued (p. 162), the "transformational voice relation operates most strongly at the top end of the scale, and serial relation most strongly at the bottom end, with varying degrees of both relations in between these two extremes."

Svartvik's 'passive scale' concept unfortunately confounded the notions of communicative sentence production and descriptive sentence generation, and embodied a rather simplistic scientism in implying that the behavioral processes of the mind can be inferred from distributional analyses of messages. Such epistemological error, however, was not uncommon at the time, and it continues to undermine the credibility of transformational competence theory. But the important thing is that Svartvik's simplifying proposal may not be simplifying enough, for two quite different patterns of mental activity are suggested as the means by which past-participial predications are uttered. Since there is no:

(a) *Everyone unloves me.

for example, it is suggested that:

(b) I am unloved by everyone.

is no less an instance of adjectival be-predication than is

(c) I am unhappy by all accounts.

And yet, because there exists a sentence:

(d) Everyone rejects me.

it is claimed that the production of its transformationally describable counterpart:

(e) I am rejected by everyone.

must somehow involve a mental analog of the passive transformation. This seems superfluous. It has been amply demonstrated that a coherent generative-transformational language description must incorporate among its theme-rheme symbol-ordering operations a rule which "is used to place a rhematic subject into the sentence final position, or to place a thematic object into the sentence initial position, or both" (Hinds, 1975, p. 90); but to suppose that speakers are bound by the same economy criteria as abstract automata is the most serious mistake of all (Watt, 1974). The very fact that one can quite acceptably say:

(f) I am unloved and rejected by everyone.

(Svartvik, 1966, p. 162) should be suggestion enough that the passive transformation is nothing but a descriptive artifact, with little or no day-to-day utility in speech.

Svartvik's compendious study, while suggestive of the kind of research that is needed in linguistics generally, and of the directions that further investigations of the voice phenomenon ought to take, simply does not go far enough, considering the progress psycholinguistics has made in the intervening years. But this is not to denigrate _On Voice in the English Verb_ one bit: it was a product of its time, as good a blend of corpus-centered structuralism, empiricism, and early transformationalism as one is likely to encounter; it filled the need for an "exhaustive treatment of the passive in present-day English" (p. 3), and will probably continue to do so for some time.

Psycholinguistic Experiments

George A. Miller's oft-cited presidential address of 1962 represents a watershed in the study of language as a behavioral phenomenon, signalling the end of the strict behaviorist era and the beginning of the cognitive era. Under the influence of Chomsky, Miller had abandoned the Skinnerian conditioned-response approach to verbal behavior, of which he had been one of the leading exponents (Miller, 1951, 1954; see also Esper, 1968, pp. 226-7), and had become "a very old-fashioned kind of psychologist" to whom _mind_ was now "more than a four-letter Anglo-Saxon word" (1962, p. 761). Recognizing language as "an extremely complicated human skill" for arranging vocal symbols in "novel and useful," hierarchically structured yet linear combinations, Miller took as his goal, and as that of psycholinguistics in general, the task of examining that skill in detail, "in the hope of learning something more about what it consists of and how it functions" (p. 748). The key to this characteristically human "combinatorial power" (ibid.) lay in the structural descriptions of meaningful utterances, as perceived by grammarians: "just as the student of space perception must have a good understanding of projective geometry, so a student of psycholinguistics must have a good understanding of grammar," especially generative-transformational grammar (p. 756).

Like Chomsky, Miller appeared to take "the grammar that each individual has somehow and in some form internalized" to be "a component in the behavior of the speaker and listener which can only be inferred . . . from the resulting physical acts" (Chomsky, 1959, pp. 56-7; see also Miller & Chomsky, 1963, pp. 464ff.). They differed considerably, however, in their notions of inference, and in what they conceived to be 'resulting physical acts:' Chomskyan grammars were, in actual practice, parsimonious accounts of the distributional properties of various successively inclusive levels of linguistic form, inferred from potential utterances by native-speaker analysts; since the grammaticality, ambiguity, and other judgments of properly informed speakers seemed unlikely to differ from those of grammarians, a given grammar's generative 'predictiveness' was deemed sufficient proof of its correctness, and any further demonstration that "an adult can instantaneously determine whether (and if so, how) a particular item is generated by [his internalized] mechanism" (Chomsky, 1959, p. 57) was regarded as somewhat superfluous. Miller, on the other hand, took linguists' intuitive generalizations about language structure to be no more than hunches, useful for the behavioral implications they might have, but whose psychological reality remained open to question until adequately demonstrated in language-use behavior:

> It is by no means obvious a priori that the most economical and efficient formal description of the linguistic data will necessarily describe the psychological process involved when we actually utter or understand a grammatical sentence. (1962, p. 756)

Knowledge of how people "induce [and presumably intend] a syntactic structure underlying the linear string of sounds in a sentence" (*ibid*.) was not to be gained, in other words, through the mere introspective study of linguistic combinatorics, but through experimental tests of the psychological implications of a grammar theory.

Thus was born the 'derivational theory of complexity' (DTC) (see Fodor & Garrett~~, 1967~~). If one could assume that the understanding of an utterance requires one to "assign a constituent structure to it," and that a generative-transformational scheme for 'manufacturing grammatical frames' provides the most plausible means of doing so, Miller hypothesized, then "the more complicated a grammatical transformation is, the longer it will take people to perform it" (1962, pp. 751-7; see also Miller & Chomsky, 1963, p. 481). Any initial doubts Miller may have had in the matter evaporated in the face of success: two- or more-step transformations of sentences (e.g., passivization) did take longer than simple one-step operations, such as negation (ibid., pp. 757-9; Miller & McKean, 1964). When similar results were obtained for the cognitive processing, through recall, of sentences which according to generative-transformational theory had to undergo zero or more transformations in order to be descriptively derived, the belief arose that speakers "recode" verbal stimuli in other language-use situations than the explicit transforming on cue of sentences, but that they still apply some mental analogue of grammatical transformation in doing so (Miller, 1962, pp. 759-61; Mehler, 1963).

The early findings of Miller and his colleagues encouraged others to extend the DTC to other modes of language processing and to derivationally more complex sentence types. The outcome is history: further successes gave way to a few equivocal results, and eventually to a number of outright contradictions, so that the theory now stands thoroughly discredited. The rise and fall of the DTC have been amply documented elsewhere (Ervin-Tripp & Slobin, 1966; Watt, 1970; Fillenbaum, 1971; Greene, 1972), and will not be recapitulated here. Miller's 'rule-reality' notion of the psychological implications of grammar theory may have led to disappointment, but the investigation of that complex combinatorial skill called 'linguistic competence' is still the main goal of psycholinguistics, and there are many experimental results still in need of adequate explanation. Relatively few experiments addressed themselves exclusively to the problem of voice, but a great many sought to investigate the interactions of voice with other syntactic and semantic variables. As many of these as appear to be relevant are reviewed below, but only in those aspects which made some contribution to the pool of empirical knowledge about voice. Many studies will thus receive highly selective treatment, with much of their investigative scope ignored as peripheral to the present inquiry.

The experimental research pertinent to this thesis may be divided into three more or less distinct categories, depending on the principal research question which was (at least implicitly) being asked. The first and by far the largest group comprises the 'complexity' studies: these assumed, inter alia, that active and passive sentences are different from each other and from other forms of locution, and they sought to establish a 'differentness' hierarchy among the structurally related members of an ever-widening sentence family. Most of the earlier experiments were motivated by the DTC, but when that notion ceased to provide credible explanations of results, Chomskyan deep structure took up the challenge, and work continued to be done in the hope of ascribing differential voice (and other) performance to the appropriate level of grammatical description. Some recent studies have suggested, however, that the formal deep-structure/surface-structure dichotomy is largely irrelevant to language use.

'Context' experiments also assumed an active-passive difference, but were more concerned with the circumstances giving rise to the use of one or the other voice, or, to borrow a phrase from Wason (1965), with the contexts of plausible subject-object inversion. Developmental studies, which sought to establish and explain differential acquisition schedules for active and passive locutions, straddle both the 'complexity' and 'context' categories. 'Compositional' studies, a relatively recent trend of inquiry including the present work, tend to view the subcomponents of sentential syntax as more or less independent phenomena; no assumptions are made as to how they are inter-related, cognitively, and experiments are conducted in order to make inferences concerning the internal structure of messages, as they are understood by mature speakers.

Sentence-type Complexity

Reproduction tasks. The mechanical task of transforming given sentences -- while it seemed to provide the most direct test of grammar-based predictions -- was beset with difficulty from the start, and little used. Miller & McKean (1964) noticed aberrations in their data attributable to subjects' unexpected interpretations of negative meaning, and Smith (1965) found evidence of a similar semantic bias; these interactions between contextual truth value and negation were more systematically explored by Wason (1965) and others. The main problems, however, were interpretational, and were of Miller & McKean's own making. A recent study by Baker & Prideaux (1975) corroborated to some extent the transformational additivity found by Miller & McKean, as well as the greater difficulty with passives observed by them and so many others, but uncovered no unequivocal relation between response latencies and any known predictive model; subjects' transforming errors, however, conformed to a straightforward 'surface-to-surface' model of performance, and, upon re-examining Miller & McKean's original data, Baker & Prideaux noted therein a similar trend.

Meaning-independent tests often showed passive syntax to be more difficult to deal with than active, exactly as linguists had 'known' and expected all along. Singh, Brokaw, & Black (1967), for example, found subjects' mere reading of active and passive sentences to be differentially perturbed by delayed sidetone and by masked feedback, both to the detriment of the latter sentence type. Another meaning-independent study achieved instant notoriety with a similar result, by virtue of the method it employed: Savin & Perchonock's (1965) experiment involving the immediate recall of sentences and random word lists. The rationale for what Wales & Marshall (1966) called the 'Archimedean' technique was that the more complex a remembered sentence were, the more short-term memory capacity it would require, and the less memory there would be left for unrelated material. Results were exactly in accordance with DTC predictions (active easier than passive easier than negative, etc.), but the simplistic view of short-term memory 'space' that was taken struck many researchers as naive. Besides, there was far too much reliance on the ordinal properties of the data: all the significance tests were non-parametric, when an analysis of variance could have been presented.

Glucksberg & Danks (1969) were able to replicate the Savin & Perchonock results, but much less reliably; word recalls, furthermore, were inversely correlated with word-recall latency, which was a direct function of the immediately preceding sentence length. Epstein (1969) also attributed differential word-list recalls to irrelevant properties of the associated sentences, for when his subjects had to recall the words first, rather than the given sentence, there were no longer any significant differences in word recall as a function of sentence type. Wright (1968, 1969b) studied the maximum difference observed by Savin & Perchonock, that between kernel sentences and negative passives: word-recall differences disappeared when homogeneous sentence lists were used, but re-appeared when verb phrases in that context were varied through the addition of auxiliaries (contrary to a finding of Miller & McKean, 1964); kernels with preverbal adverb phrases were thought to match negative passives in reduced word recall because of structural similarity, but this factor could not be disengaged from mere differences in word count. Matthews (1968) was unable to replicate the Savin & Perchonock results at all, but he found that the longer versions of a sentence type, containing prenominally inserted adjectives, consistently decreased word recalls within sentence types. A similar adjective-related decrement in sentence recall has been reported by Andre (1973).

The mechanical reproduction of linguistic strings seems to be affected by their mechanical properties at least as much as by their perceived structure; when these covary, as in many sentence types, reliable inferences are difficult to make. Singh, Brokaw, & Black (1967) reported reading-time increments for passive sentences which were out of proportion to the syllable-count differences, but they offered no hard data in support of this claim. Organismic variables no doubt play a part, as well. If linguistic structures do differentially facilitate 'chunking' in short-term memory, that fact would never become apparent in a set of uniform responses; by requiring complete sentence recalls, and then ignoring these responses, the

'Archimedean' studies may have been obscuring the very phenomenon they sought to capture.

Graham (1968) tried to circumvent both the sentence-length and 'total recall' problems by having educationally subnormal children repeat eight-word sentences of varied structure. Again, passives appeared to be more difficult than many non-passive forms, but only for those who had scored most poorly on a short-term memory test; subjects who could repeat four or five words from given random lists found all the sentence types equally easy. Active-passive differences were thus better correlated (r = 0.82) to short-term memory capacity than to any discernible linguistic factor. Jon F. Miller (1973), by the same token, controlled extensively for word count, surface complexity, and sentence type, in sentences for repetition by normal pre-schoolers, and yet the most potent factor affecting correct recall in his study (as in Martin & Roberts, 1967) was sentence length: the longer the sentence, the more poorly it was recalled. The only grammatical effect observed was interactive: 'high Yngve depth' passives and WH-questions (see below) were harder to recall, and what made them 'deeper' than their equally long 'shallow' counterparts was the prenominal and preverbal stacking of modifiers more common in literate adult language. It seems, therefore, that sentence repetition is more than just a "perceptual-motor skill" (Fraser, Bellugi, & Brown, 1963): speakers must perceive and make some use of structural properties when remembering sentences, for even severely subnormal children echo them better than random word strings, but what it is they do remains shrouded in experimental artifact.

The Yngve depth hypothesis. Delayed recall, free recall, and recognition studies have not fared much better than simple sentence reproduction, in elucidating voice cognition. They were, furthermore, open to contamination by a number of extraneous variables, including meaning, which was for a long time generally ignored. The Yngve depth hypothesis (Yngve, 1960, 1964) claimed that speakers incur commitments -- at most seven at a time -- as they speak, to finish in grammatically acceptable fashion every constituent and clause they choose to initiate during the course of an utterance. As a theory of language structure, the Yngve model was generative, but not transformational, treating sentence production strictly as a surface-structure phenomenon; it was thus completely at odds with Chomskyan transformational theory, which was not a production model, but was -- and continues to be -- widely misinterpreted as one (see, e.g., Fodor et al., 1974). Many workers assumed it to be one, if only for heuristic purposes, and performed experiments designed to show whether sentence recodings were isomorphic with surface structure or only indirectly related to it by mental analogues of grammatical transformations. Voice syntax, given its key status in transformational theory (see Chapter 2, above) and its obvious structural differences, was inevitably involved.

Martin & Roberts (1966) developed the 'mean Yngve depth' metric for indexing the surface-structural complexity of sentences, and found this variable to interact significantly with sentence type, even though sentence length in words was held constant: mean depth was a significant factor in a free learning task, adversely affecting the recall of affirmative passives, both the agentful and 'replaced-agent' varieties, and affirmative actives, but not the recall of negative passives, which were inexplicably no harder to remember when 'deep' than when 'shallow.' Active affirmatives at both depths were somewhat harder to recall than agentful passives, but did not differ statistically from replaced-agent passives, for which they were frequently mistaken. As was pointed out above, Yngve depth, word count, and sentence type are not altogether unconnected; the attempt to vary one independently of the others can lead to awkward sentences, which inject unprovided-for semantic effects into the data. In view of this, and the strong Depth X Type interaction, and the not-quite significant active-passive difference, Martin & Roberts' claim to have refuted the transformational hypothesis and established the surface-structure model must be taken with a grain of salt. Besides, they were unable to replicate depth-related recall differences in active affirmatives the next year (Martin & Roberts, 1967).

In order to preclude rehearsal and minimize semantic intrusion, Martin, Roberts, & Collins (1968) used delayed recall with counting-activity-filled intervals to test for differential forgetting among seven-word sentences. Again, there was a significant Mean Depth X Sentence Type interaction, with deep and shallow actives non-different as in Martin & Roberts (1967), and deep passives with two VP-adverbs predictably harder to retain than shallow passives with none. As mentioned above, this pattern was also obtained by J. F. Miller, whose worse-recalled 'deep' constructions were stylistically clumsy (1973, pp. 12-14). Perfetti (1969a) also found deep passives harder to recall than shallow ones, as the depth hypothesis would predict, but obtained no reliable active-passive difference; all other mean-depth differences, furthermore, were either nonsignificant or in the wrong direction, leading Perfetti to question the validity of both the transformational and Yngve models. Further experiments (Perfetti, 1969b) involving mean depth and the proportion of lexical, as opposed to functional, words in a sentence ('lexical density') found sentence recall related only to the latter, with mean depth exerting no influence at all.

The relation between sentence-type-induced differences and support or denial of generative models was always tenuous, at best, for sentences which differed in mean depth of necessity differed in surface structure, and if the crucial element was a modifier -- as Rohrman (1968) pointed out -- there was considerable difference in deep structure, as well. Epstein (1967) found long anomalous sentences with active 'chunks' to be easier to learn than the same with passive chunks, but he attributed the effect wholly to superficial organization; this result was somewhat akin to the reading facilitation Coleman (1964, 1965) had achieved by 'activizing' passive constructions in prose passages. Bacharach & Kellas (1971) also found active-passive differences, but had to ascribe them to the effects of surface structure, since Chomskyan deep structure predictions did not materialize; the differences they observed would not have been predicted by mean depth or lexical density either, these experimenters pointed out, because the sentences were equally complex on both metrics. Salzinger & Eckerman (1967) and Andre (1973), on the other hand, found no recall or error differences related to voice syntax at all, nor did Wearing (1970), who warned of the dangers of disregarding semantic variables in psycholinguistic work; the latter, however, cited a significant mean-depth effect as evidence for the primacy of surface structure in the "abstraction of core meaning" (p. 28).

Acutely aware of speakers' sensitivity to "informational or contextual constraints on the individual sentence elements", Roberts (1968, p. 1072) put his finger on one of the major sources of confusion in mean-depth experiments. His Sentence Type X Mean Depth interaction directly contradicted Martin, Roberts, & Collins (1968) -- and also

Martin & Roberts (1967), Perfetti (1969a), and J. F. Miller (1973) -- but the two 1968 studies were strikingly similar in that their subjects had a strong tendency to forget the two adverbs which differentiated each 'deep' sentence from its shallow counterpart. The major thrust of Yngve's depth hypothesis was that languages provide syntactic 'postponement' strategies for lightening the memory load of incurred 'commitments;' the way to increase sentence depth for experiments was thus through various 'preponement' devices such as prenominal and preverbal modification. English adverbs, with their fluidity of occurrence, have defied adequate grammatical description for generations; no wonder subjects found them labile in sentence recall, particularly those which intruded into verb phrases.

It has already been mentioned that the attempt to vary mean depth, sentence type, and word count orthogonally in experiments can produce awkward or unusual sentences. The situation is, in fact, worse than that, for the machinations by which sentence types are 'deepened' -- whether word counts are changed or not -- result in sentences whose structure is not exactly comparable to others allegedly of the same type, let alone to the equally varied range of structures that comprise an opposing type. It may be that such experiments were dealing with as many kinds of sentences, all partly similar to each other, as there were major cells in their design, and since structure also conveys meaning (a point that is all too often overlooked) the general lack of agreement among such studies is not surprising. "Clearly it is extremely difficult to make unconfounded comparisons between different types of sentence" under such circumstances, as Wright (1969b, p. 68) observed; in an attempt to control mean depth without bringing in extraneous semantic factors, she had devised sentences which varied only in voice and the position of a relative clause, but the result of the experiment was an active-passive difference supporting Savin & Perchonock (1965), and no mean-depth effect at all, when Herriot (1968) had obtained a most favorable result with similar stimuli. As far as sentence recall and the cognition of voice were concerned, psycholinguistics seemed no wiser than ten years before.

One further negative aspect of the mean-depth experiments was that they were overly preoccupied with declarative sentences. Given the apparent futility of isolating inextricably correlated factors in this realm, it seems unlikely that this deficiency will be remedied soon, at least until a better surface-structure complexity metric has been devised; as Fillenbaum (1971) has suggested (pp. 277-8), the mean depth metric devised by Martin & Roberts may not be the most appropriate quantification of the Yngve model. Contemporaneously with the mean-depth experiments, however, a parallel body of research involving sentence 'families' accumulated, in which the cognitive interactions among a more restricted range of syntactic variation, including voice, were explored, using a variety of techniques. By studying similarities and differences in language-use behavior with respect to different sentence types, these studies sought for clues about similarity relations among the mental representations of such sentences, and ultimately, for information as to the nature of those representations themselves, and how they are internalized.

Sentence-type families. Miller's (1962) and Mehler's (1963) data led them to believe that alternation in one syntactic dimension was psychologically no greater than alternation in another, and the apparent additivity of their results suggested a city-block-space model for perceived grammatical relations among sentence types. Subsequent work was soon to amend these conclusions, however. Lane & Schneider (1963), for example, were concerned with "the discriminability of syntactic structures, that is, the degree to which they do not overlap in controlling differential responding" (p. 457): where Miller and Mehler had observed a tendency for erroneous recalls to be 'kernelized,' Lane & Schneider found actives and passives equally confusible with each other, but not so negations or questions, which suggests that voice opposites are in some way more like each other than are affirmative-negative or declarative-interrogative counterparts. This result was to be replicated in a variety of ways throughout the next decade, but interpretations of it were to vary considerably from one study to the next, depending on the theoretical viewpoint of the researcher.

Clifton, Kurcz, & Jenkins (1965) used a motor response generalization task to measure the recognition errors among active and passive affirmatives and negatives, and found evidence against an equilateral representation of the differences: negation and its inverse appeared psychologically much greater in their experiment than the voice alternation, and the two interacted somewhat, in that passivizing a negation did not seem to alter it as much as passivizing an affirmation. Following up an observation by Mehler (1963) that negative and non-negative questions were frequently confused, Clifton & Odom (1966) noted that transformational theory had since 1957 made an attempt to account for sentential meaning, and that the Katz & Postal (1964) analysis reflected the apparent synonymy among question forms. Four experiments -- one similarity-ranking and three sentence-recognition -- confirmed the Katz & Postal model, and suggested that the structural relations among sentence types were better represented by a prism than by a cube: negation interacted differentially with voice and the declarative-interrogative dimension (henceforth, 'mood') such that negation differentiated declaratives more than passivization did, but hardly differentiated questions at all. Re-analysis of Mehler's published data yielded the same pattern. Koplin & Davis (1966) obtained similar results with a more difficult aural recognition task.

As time went on, it became increasingly evident to many workers (e.g., Fillenbaum, 1970, 1973) that the use of recall and recognition techniques may well have been producing data related to the recoded form of sentential representations in the mind (or rather, the similarity relations among them), but inextricably bound in with such data would be the unknown effects of storing, retrieving, and reproducing those representations. Language use, in other words, is a meaning-related activity; experimenters had by and large overinterpreted Chomsky's (1957) admonitions about the independence of grammar, and could no longer go on treating meaning as a nuisance variable in studies of what Miller (1967) called 'psyntactic structures.' The way to get at the underlying mental representation, Fillenbaum suggested (1970; 1973, pp. 26-7), was by culling out the effects of understanding the sentence, and the way to do that was to have subjects manipulate sentences in a meaningful way, as a controlled factor in the experiment.

Some workers had understood this need all along. Gough (1965), for example, used sentence-verification time as a measure of speed of understanding, and obtained results consistent with the Miller-Mehler recoding hypothesis: actives were verified (and understood?) faster than passives, affirmatives faster than negatives; voice opposites differed less than affirmative-negative (henceforth, 'modality') opposites, and the absence of interaction between these variables supported the additivity they were claimed to have. There were complicating factors, however, Gough insisted: if understanding a sentence required decoding surface relations into 'kernel' relations, then he had no clear case, for his dependent measure included 'kernelization' time, confounded with pure verification time.

By delaying the presentation of pictorial evidence, Gough (1966) hoped to encourage immediate kernelization, whereupon all verification times should have been equal. But such was not to be the case; the very same voice and modality relations were obtained as before, arguing for the differential encoding of different syntactic form features, but against the 'detransformational' recoding of underlying structure. Morris, Rankine, & Reber (1968) forced their subjects to kernelize by requiring an agent-verb-object motor response to active and passive sentences, and obtained at least in part the effect that had eluded Gough. But their results were equivocal enough, they maintained, not to constitute unqualified support for the kernelization hypothesis: only in the (unfilled) delayed-response condition did equalization of response times occur, and even then only between actives and passives, not between affirmatives and negatives. Their immediate response means were ordered the same as Gough's (1965, 1966) and, for that matter, Slobin's (1966), which suggests that people can perform subject-object inversions on cue if they have to, but not necessarily that they recode the meanings of sentences that way in conversation (see also Wright, 1969a).

Slobin (1966) also used the picture-verification technique, partly to study the ontogenesis of voice and modality syntax in its semantic and pragmatic aspects, but mostly to subject the DTC to further semantic testing. Like Miller & McKean (1964) and Gough (1965, 1966), he found a K < P < N < PN (i.e., Kernel < Passive < Negative < Passive Negative) order of apparent processing complexity over all age groups, where the DTC would have predicted N < P on the basis of (surface) syntactic differences and assumed linear additivity. The implicit Voice < Modality ordering, however, was quite consonant with the findings of Clifton & Odom (1966), who stressed the multidimensional rather than linear nature of sentential complexity. Slobin's most important finding, as far as voice was concerned, however, was the interactive effect of semantic agent-object role interchangeability: sentences with nonreversible lexical content (e.g., 'the girl waters the flowers') were verified more quickly, overall, than reversible ones, and this factor made passives as easy to verify as their active counterparts, especially for the younger children in the study.

Herriot's (1969) findings showed, however, that agent-object reversibility is not a problem for the speaker unless he is temporally or spatially displaced from the event being described. His subjects' performance suffered mainly when their expectations were being violated: in telling the agent and object, in that order, of a just-described event, reversibility was no problem, but voice was, for objects precede agents, in the passive; but when semantically non-reversible pairs were reversed, that was the greater violation of expectations, and voice effects all but disappeared. Pragmatic expectations are thus by far the more potent factor; the role of reversibility in a theory of syntactic cognition was still not clear, but the findings did focus workers' attention on the semantic role relations within sentences.

Order of acquisition. Slobin was well aware that the unequal difficulty of actives and passives was more pronounced in children, but even his youngest subjects, six-year-olds, "had sufficient control of the passive to take part in the experiment, although detailed, qualitative examination of preliminary interviews of Ss suggests that full control of the passive is achieved later in life than full control of the active" (1966, p. 221). The kindergartners had demonstrated the ability to understand passive sentences and to produce them upon elicitation, but only the seven- and eight-year-olds in Slobin's study were observed to emit full passives spontaneously (see Turner & Rommetveit, 1967a, p. 650). In support of Slobin's 'full control' hypothesis, Bever (1970, pp. 304-5) has pointed out that age seven to eight is also associated with the acquisition of the integer concept, and cites corroborative correlations between children's scores on grammatical and numerical transformation tasks.

At the time the Slobin (1966) study was conducted, first-language acquisition research was just beginning to gather momentum, and something was known of the emergence of voice syntax in child language. In a longitudinal study of his daughters' bilingual development, Leopold (1953) had reported "no passive voice until much later" than two years (p. 12). Fraser, Bellugi, & Brown (1963) found the imitation, comprehension, and appropriate production (on request) of passive declaratives by three-year-olds to rank ninth in ten tests of their grammatical competence; even though their imitation of passives was far superior to their understanding and use of them, correct repetitions occurred in only half the cases. Harwood (1959) found no evidence of 'true' passives in the free speech of five-year-olds from working-class families, but Menyuk (1963) recorded them in the language output of 23 out of 48 three- to four-year-olds of the upper middle class, and in that of 41 out of 48 six-year-olds from the same background. Menyuk also found the use of the _have_...-_ed_ auxiliary to differ significantly from one age group to the other, and observed it in the speech of only eight and ten children in each group, respectively. This finding has definite implications about children having to sort out passive and perfective morphology in English, and it lends some support to the suspicion of Fraser _et al_. (1963, pp. 132-3) that three-year-olds tend to treat object-verb-agent sequences as if they were the more common agent-verb-object sentence type, with vaguely familiar "appurtenances."

Hayhurst (1967) attempted to replicate and extend the Slobin (1966) results with reversible and non-reversible passives, but was unable to obtain a reliable reversibility effect, in a model-sentence emulation task with Irish state primary school children. Agentless passives were a little easier for her five-year-olds to produce -- though they performed quite poorly, overall -- and also for her six-year-olds. Inter-type differences were not significant for her nine-year-olds, but these children's control of passives was far from what Slobin would have called 'full,' for these older children emulated even simple agentless passives correctly only 72.5 percent of the time. It is not inconceivable, in light of Hayhurst's and Harwood's (1959) findings, that the acquisition of the passive 'turn' -- presumably a function of occurrence in the language learner's environment -- may vary considerably from one socio-economic stratum to another (see also Goldman-Eisler & Cohen, 1970).

Turner & Rommetveit (1967a) were more successful in replicating Slobin's reversibility interactions, and Fraser _et al_.'s I < C < P effect (Imitation < Comprehension < Production) as well, extending the imitation, comprehension, and production tests of the latter study to four- through nine-year-olds. Results were as expected, and very consistent: imitation was easier than comprehension, comprehension easier than production; actives were easier than passives, non-reversible easier than reversible; and each age group performed better than all younger ones. Unlike the Hayhurst study, there was a ceiling effect of perfect or near-perfect scores for the nine-year-olds, for whom there were no significant differences among tasks or sentence types. But along with Fraser *et al*. and Menyuk (1963), Turner & Rommetveit speculated that children initially treat all subject-verb-adjunct sequences as actor-action-acted upon, and only gradually learn that certain syntactosemantically ambiguous markers -- *be*, -*ed*, and *by* -- signal a reversal of roles, but not of grammatical function (1967a, pp. 657-8; see also Bates, 1969, pp. 140ff.).

Jakobson (1966, p. 269) had observed a similar tendency on the part of Russian children to misinterpret object-verb-agent stylistic inversions such as *Papu ljubit Mama* (= 'It is Papa that Mama loves') as agent-verb-object sequences, viz., 'Papa loves Mama,' failing to notice the -*u* inflection on the object noun. Herriot (1968) observed a similar agent-subject bias with respect to English cleft sentences, and Greenberg considered it a primary language universal that agents almost always precede objects in transitive declarative sentences (1966, p. 77). Bever (1970, pp. 298ff.) referred to this phenomenon as 'perceptual strategy D' and found evidence of a curious tendency for children to overapply it at about age four, leading to a temporary 'dip' in their apparent ability to understand passives correctly. Maratsos (1974) found further evidence of this trend, while pretesting three- and four-year-olds for a related experimental task.

Deep vs. surface relevance. Though by no means unequivocal, the adult experimental results provided strong indications of the significantly greater psychological complexity of the passive voice, and the developmental findings lent this notion further support. But this relatively crude bit of information revealed nothing as to the internal organization of speakers' mental representations of active and passive (and other) sentences, nor of how these representations might be arrived at; a number of researchers thus turned their attention to these problems, and the relevant findings are reviewed below. No one knew with any certainty what kind of psychological processes were involved, but the belief that sentential meaning is somehow extracted from word strings in an active, interpretive manner in real time continued to be a widely-held and plausible assumption. The crucial issue was the relevance of deep structure, as it is formalized in Chomskyan linguistics and endorsed by numerous psycholinguists such as Fodor and his associates: they have argued repeatedly that the total meaning of a sentence is abstractly, albeit imperfectly, represented by its generative-transformational deep structure tree, and that the psychological complexity of a sentence is inversely correlated to the degree to which overt surface structure provides clues as to the relations among the abstract elements in deep structure (Fodor & Garrett, 1966, 1967; Fodor, Bever, & Garrett, 1974).

The literal interpretation of Chomskyan grammar as a psychologically predictive model should have ceased with the demise of the DTC, but with the Fodor-Garrett 'abstract linkage' hypothesis as fresh encouragement, grammar-motivated research went on, leading to some highly questionable interpretations of results. Blumenthal (1967), for example, found 'Gloves were made by hand'-type passives as easily recalled as full passives with subject-noun ('gloves') prompting, but more poorly recalled with postverbal adjunct prompting ('hand' for manner-adverbial passives, 'tailors' for full passives). He attributed this effect to the 'fact' that agent nouns are "related to the entire sentence as logical subject" in deep structure, whereas manner-adverbial phrase heads have only that phrase as their scope (p. 205); in other words, those lexical items are better remembered -- and their associated sentence constituents along with them -- which are 'higher' in the abstract phrase-marker which diagrams the basic meaning relations among the constituents of the sentence, as perceived _a priori_ by grammarians (Fodor _et al_., 1974, pp. 258ff.).

Besides putting the inferential cart before the horse, this explanation seems to ignore a perfectly viable alternative, i.e., that agentive by-phrases and manner adverbials have different structural meanings on that level which is most readily available to the speaker-hearer -- the surface. If to be sensitive to such a syntactosemantic difference is what is meant by inferring deep structure from surface structure, then the dispute is merely terminological. But to imply that speakers behave as they do because supposed underlying relations are represented in a certain way in some non-behavior-oriented descriptive theory is quite a different matter: it is not a question of this versus that inference from a given body of data, but a matter of researcher attitude toward the process of scientific inference itself, and that is not an empirical question at all (Reid, forthcoming [a]; pp. 48ff., above).

Levelt & Bonarius (1968) also criticized the 'deep structure position' explanation offered by Blumenthal as unnecessary to account for the understanding of sentences, especially in richly-inflected languages such as Finnish. Instead, Levelt proposed a literal application of the 'deep structure clue' hypothesis first advanced, but never articulated in detail, by Fodor & Garrett (see above): quite simply, speakers infer semantic role relations directly from surface structure, both syntactic and morphological. Levelt & Bonarius were unable, in either Dutch or Finnish, to replicate Blumenthal's effect whereby constituents having a 'higher' place in deep structure were better prompts for recall. However, passives were much better recalled than actives in Finnish, especially under verb prompting, because object nouns and passive verbs are distinctively inflected in that language, providing fairly obvious signals of the intended role relations. Dutch passives were not much better recalled than actives under either subject-noun or verb prompting, probably because, as in English, nouns are not inflected for case at all, and verbs are ambiguously inflected for passive and perfective aspect, relying on auxiliaries for clarity of intent. If messages can thus be decoded from superficial features alone in the context of discourse, one wonders why abstract levels of representation need be postulated at all.

Bacharach & Kellas (1971) also had to contradict Blumenthal, for they found full and manner-adverbial passives to be more like each other in recallability than like actives, which were recalled more quickly than the other two types in one experiment, and more adversely affected by length of retention interval, in another. Since Chomskyan theory analyzes the differently-recallable sentence types as deep-structurally the same, and vice versa, Bacharach & Kellas concluded that surface constituent order was the governing factor in short-term retention, not deep structure. That highly similar word strings should be equally easy to remember is, however, just what one would expect, in a non-meaning-extracting memory task; why esoteric deep-structural explanations have to be resorted to in such cases is something of a mystery. But the problem was still to find an alternative explanation for Blumenthal's results.

The Blumenthal effect underwent further testing at the hands of Danks & Sorce (1973), who had noticed that half of Blumenthal's prompt words had been concrete nouns -- usually high in imaginal properties and associability (Paivio, 1965) -- and half had been abstract nouns. Manner-adverbial phrase nouns used as prompts should have affected sentence recalls equally, if imagery value were irrelevant, but low imagery nouns in that condition worsened recalls significantly, in the Danks & Sorce experiment. Agent-noun prompts were equally effective, regardless of imagery value, leading Danks & Sorce to conclude that imagery and syntax affect memorability about equally, but not additively. Translated into semantic terms, this result could be taken to mean that transitive agency makes as good a conceptual peg on which to hang associated concepts for later recall as noun concreteness and imageability.

In a more meaning-oriented recall experiment, Sachs (1967) did not elucidate how sentences are semantically interpreted, but she offered some evidence that they are, and that surface voice syntax exerts little long-term effect. After 80 or 160 syllables of intervening prose material, her subjects recognized test sentences as semantically altered versions of within-paragraph sentences with a high degree of accuracy; correct recognitions of voice opposites, stylistic variants, and repetitions, however, fell almost to chance, with voice alternants being most frequently characterized as changed in form rather than in meaning. Sachs concluded that the surface structure of a sentence is quite dispensable and labile in memory, once the meaning structure it symbolizes has been apprehended; but whether that meaning structure is best represented by the transformationalist deep-structure concept in this case would seem to depend on linguists' current position with respect to active-passive synonymy.

Seeking to better characterize the memory 'trace' associated with a sentence, Bregman & Strasberg (1968) analyzed first and second guesses in a forced-choice recognition task, and found evidence for the extensive use of semantic clues in the attempt to reconstruct syntactic forms. Since first-guess voice errors were followed at better than chance levels by correct responses, and first-guess mood and modality errors were not, it was surmised that something to do with sentence voice is encoded as part of the meaningful content, though the fact that voice syntax is forgotten at all would suggest that that something does not reflect surface constituent order directly. Like Sachs (1967), Bregman & Strasberg believed that unless there is a good reason for remembering surface form, these "properties of the transmission code" are discarded, once the basic message has been stored (p. 402).

Lippman (1972) agreed, since her subjects generally remembered negation, a vital bit of information in a syllogistic reasoning task, but tended to formulate their conclusions in the active voice, despite experimental conditions designed to create a passive bias in half the cases. Lippman's finding that syllogisms whose major premise was passive and/or negative took longer to solve and were consistently rated harder is in accord with the meaning-based findings of Miller, Mehler, Gough, and many others, but her quasi-detransformational view of sentence interpretation is neither complement to nor substitute for the processless deep-structure hypothesis, since neither has received unequivocal empirical support, up to this point.

Like Sachs and the others mentioned above, Anderson (1974) was also concerned with speakers' internal representations of sentences -- whether 'verbatim' or 'propositional' -- and with the relevance of memory to the process of understanding a sentence. A number of experimental findings, Anderson pointed out (e.g., Sachs, 1967; Fillenbaum, 1966), suggested that "with no delay, there is a verbatim image of the sentence from which information about both form and content is available. The verbatim image, however, is replaced by a more permanent, more semantic representation in long-term memory;" but not completely, for there is evidence of residual memory for surface structure [as, e.g., in Bregman & Strasberg (1968)] (Anderson, 1974, pp. 149-50). The Miller-Mehler 'kernel plus tag' phenomenon seems to keep cropping up in experiments, demanding an adequate explanation!

Anderson's experiments in the immediate and delayed verification of sentences basically confirmed his hypothesis, but suggested a modified form: it is not so much a question of short- vs. long-term memory, nor of one kind of representation replacing another, he claimed, but rather that two representations are formed, a perceptual one and a propositional one, and that the former has a very fast decay rate, relative to the latter. The propositional encoding, furthermore, "seems to have an active-like character, as indicated by the slow verifications to passive probes at delays" (1974, p. 161).

The meaning of syntax. While it seemed to corroborate and explain a whole line of 'kernelization' findings beginning with Miller (1962), the Anderson study was flawed by a number of erroneous assumptions having to do with subjects' memorization strategies and the voice-matching problem, both of which are discussed further, below. Anderson's most questionable assumption, however, and one which he shared with almost everyone involved in psychosyntactic experimentation, was that syntax is form, content is meaning, and that superficial form ('surface structure,' 'constituent order,' or whatever) is quickly forgotten, whereas gist (deep structure, propositional content, underlying meaning, etc.) tends to be remembered. Baker, Prideaux, & Derwing (1973) forcefully brought to psycholinguists' attention an old structuralist concept that had fallen into disuse since the Chomskyan revolution -- the notion of structural meaning. That is, grammatical constructions of a given constituency have a certain meaning which is largely independent of the particular lexical items used in speaking them, and which remains constant despite paradigmatic lexical substitution. Not so with syntagmatic alteration, however, which creates a different grammatical structure with a different structural meaning. Failure on the part of so many theorists to appreciate the *semantics* of syntactic structure has led to innumerable difficulties of interpretation, and casts doubt on many an experimental result. As Baker *et al*. pointed out to memory-task researchers in general:

> Only through context will the pattern take on the semantic significance required to facilitate its recall. Rather than suggesting . . . that subjects recall the semantics but forget the syntax, [kernelization] data demonstrate that important semantic information is lost. Subjects recall [lexical content] under prompting with [lexical] elements, but only fragments of [structural meaning] accompany them. It is difficult, then, to see how [such] data can convey information about similarity of syntactic patterns as patterns or even in terms of the semantic implications of those patterns. (p. 216)

The Baker *et al*. study appeared to replicate a great many 'complexity' experiments, in that voice differences took longer to detect than mood or modality differences. Support for the DTC, however, is excluded by the fact that no subject was ever presented with a voice alternation as such; informants had to learn to identify one of eight sentence types among exemplars which were presented serially, in random order, with no lexical content set occurring more than once in every sixteen. Since actives and passives are most different in overt form -- and Baker & Prideaux (1975) have shown that surface structure is what counts, in these matters -- the voice difference should have been the most obvious, as a feature distinguishing sentence types. But it was not; it was, in fact, the least obvious difference, adverted to last, by most subjects, and sometimes not at all. This clearly indicates that judgments were not being made on the basis of that which is apparently most different about actives and passives -- their surface structure -- nor even on the basis of what has for centuries been claimed to be the _same_ about them -- their propositional content: subjects were exposed to a bewildering array of lexical contents, and in fact never had to compare any passive with its corresponding active directly; comparisons had to be made on the basis of sentential _patterns_, abstracted from any particular content.

The only characteristic of voice, mood, and modality which correlated with the Baker _et al_. data, and could thus serve to explain them, was the univocality of the associations between what are ultimately arbitrary linguistic forms and their conventional structural meanings: those distinguishing affirmation from denial and declaration from interrogation rate high on this scale, but the signals of passiveness -- _be_, -_ed_, and _by_ -- are syntacto-semantically ambiguous, as has been pointed out from time to time in the present work, and rate low.

Reid (1972, 1974b) replicated the Baker et al. results in the aural-oral mode, and therein raised the additional possibility that, since the majority of subjects were able to distinguish activeness in sentences from passiveness, despite having been made oblivious to the subject-object inversion said to characterize voice alternation above all else, that perhaps the passive locution is not regarded by speakers as an 'inverted' manner of speaking at all; that the passive transformation has no reality, in other words, except as an abbreviatory sentence-describing device. Speakers, unlike grammarians, never need to juxtapose passives and their corresponding actives. Nor did the subjects in the Baker et al. and Reid experiments, who had to make their judgments on the basis of passive structure in general versus active structure in general: they seemed unaware, through most of the procedure, that the subjects of half the sentences they were being exposed to stood in a different role relation to their verbs and postverbal adjuncts than did the subjects of the other half; either that, or they were aware of it and did not regard it as a difference in form, which indeed it may not be. These semantic role relations are presumably part of what is signalled by the use of be, -ed, and agentive by, in sentences; how this signalling takes place, and why it seems so equivocal, are the questions that motivated the present work.

Linear processing. To return to the topic of how speakers internalize the meaning of a sentence, there has been, along with the plethora of deep-structure hypothesis experiments of recent years (see Fodor et al., 1974), a small but encouraging countertrend of work exploring with some success the simple yet unpopular notion that sentential meaning can be inferred in 'left to right' fashion from the perceived structure of the available speech signal, without the invidious comparisons between speaker strategies and generative-descriptive processes that have marred so much psycholinguistic work in the past. The notion that sentences are composed, uttered, and perceived left to right -- first to last, really -- is, of course, not new; the Yngve depth hypothesis sought to model just that. The present general lack of interest in Yngve's theory came about as a result of the widespread failure of experimenters to achieve unequivocal results, but whether that is to be accounted for by inappropriateness on the part of the Martin & Roberts mean-depth metric, or by researchers' inability to devise sensitive enough designs, or by basic flaws in the model itself, remains an open question (Fillenbaum, 1971).

The trend of research which is of interest here began with Clark (1965): this was a unique study at the time, not only because it argued on empirical grounds "for a sequential left-to-right generation of sentences" against a tide of transformationalism (p. 365), but also because Clark unequivocally distinguished between grammatical subjects and semantic 'actors' -- an all too infrequent occurrence, in the voice literature. His experiment had more to do with the inter-constituent relations in active and passive sentences, which topic is dealt with more fully below, but there were clear indications that actives and passives have their own characteristic patterns of sequential semantic constraint, such that the one form of locution is not merely the converse of the other. Hence, its inclusion here.

The Clark (1965) finding was replicated and extended by Clark & Begun (1968), who had students process sets of active and passive sentences generated from a basic natural set by means of subject, verb, and object permutation. There was again evidence of left-to-right processing, in that grammatical subjects had thematic prominence in both actives and passives, tending not to be replaced in order to achieve (greater) sensibleness; rhematic lexical items near the (right) end of sentences had the greater tendency to be replaced. These left-to-right semantic dominance relations exhibited hierarchical dependencies, as well: in both the sensibleness-rating and word-replacement tasks, there was evidence of maximum cohesiveness in the (left-end) subject constituent, next greatest in the predicate (i.e., verb + adjunct), and the least, between these two at the whole-sentence level, and these structural relations obtained equally in actives and passives. It was as if the deliberate analysis of intrasentential meaning had led subjects to recapitulate surface-structure phrase-markers from the bottom up.

As further argument against the transformationalist view of active-passive synonymy, Clark & Begun offered evidence in support of the Clark (1965) finding that "the situations described in passives have less in common with each other than the situations described in actives" (1968, p. 227). Taylor (1969) reported a similar lexical asymmetry, in that infrequently-occurring, erudite stimulus words tended to elicit passive impromptu sentences, whereas common words elicited mostly active declaratives. M. Johnson (1967) had observed a structural asymmetry between actives and passives, leading him to conclude that "different positions have different structural meanings, and that these meanings are not the same in both active and passive sentences -- even for functionally equivalent positions" (p. 245). Johnson-Laird (1968a, 1968b) also found active and passive sentence subjects to be thematically dominant, as had Clark & Begun, and he agreed with them and with Johnson that the two voices convey different patterns of emphasis, and are hence not interchangeable in discourse.

James (1972) replicated the subjective hierarchical organization found in Clark (1965) and Clark & Begun (1968), but denied that sentence subjects have thematic prominence by virtue of syntactic position alone. Citing observed tendencies for agents of transitive verbs to be animate, hence more imageable (Paivio, 1969), James found sentence subjects and postverbs to be equally recallable when controlled for imagery value, in both active and passive sentences, and suggested that thematic prominence in language use is more a function of "nonsyntactic (i.e., situational) factors, such as context, saliency of content (e.g., I-value), and idiosyncratic interests" (p. 210). James' finding does not, however, vitiate the psychological pre-eminence of the 'left end' position in sentences, for two of the most effective surface constituent order options used by speakers of English to emphasize their intended thematization are the cleft and reverse pseudocleft orders -- both syntactosemantic 'fronting' manoeuvers (Fletcher, 1973; Hornby, 1972, 1974; Andrew, 1974).

Further support for the thematic prominence hypothesis can be gleaned from the Turner & Rommetveit (1967b, 1968) findings that pictures of the sentence subject, whichever the voice, facilitated the recall of both actives and passives, and from the work of Tannenbaum & Williams (1968a), who obtained a similar effect through attention-focusing preambles to their sentence-emission cues. Prentice (1966) surmised that first-to-last processing is the more natural way to use language, because active and passive sentences in her study were easier to learn when thematically-dominant sentence subjects governed the form and arrangement of rhematic material. Huttenlocher & Weiner (1971) found that, in order to understand sentences describing spatial relations to be effected among a set of objects, children used active and passive syntactic cues to determine the direction of a reversible transitive relation, but tended to focus on the grammatical subject of the sentence and its role in the relation.

Further work tending to support the linear processing hypothesis included a series of 'voice mismatch' studies (Wright, 1969a, 1972; Olson & Filby, 1972; Garrod & Trabasso, 1973; Anderson, 1974), which showed that input sentences were reacted to more quickly and more correctly when the verification probe sentence or question to be answered matched the input sentence in voice. Passive sentences, Olson & Filby suggested, need not be mentally 'activized' unless the situational context, for some extraordinary reason, requires it; they can be understood and utilized quite well in their surface form. Looking at the obverse side of the coin, Wright commented: "If forcing people to make transformations results in more errors, this also suggests that people do not normally carry out such processing as an integral part of understanding sentences" (1969a, p. 156).

By 1974, Clark had abandoned his earlier notions of left-to-right sentence processing, and had embraced the 'recovery of deep structure' view, suitably updated so as to conform with the linguistic times. The comprehension of actives and passives was now to be explained in terms of their McCawley-Ross-Postal-Lakoff propositional structure (see Chapter 2, above): whereas a sentence X V+ed Y is understood as (X did (X verb Y)), Y was V+ed by X is understood as ((X verb Y) happened to Y). Both deep structures contain the same embedded proposition, but different embedding propositions; the language user's task, in a voice-mismatch or other surface conflict situation, Clark proposed, is to detect the matrix-proposition incongruency in his mental representation and bring about a reconciliation: "people represent the meaning of a sentence in an abstract symbolic form at Stage 1, represent other information in the same format at Stage 2, compare these two representations by a series of match and manipulation operations at Stage 3, and 'convert' the symbolic Stage 3 outcome into a response at Stage 4" (Clark, 1974, p. 1415).

Despite the inherent plausibility of the 'doing' vs. 'happening' concept (see Chapter 5, below), such a performance theory as Clark's is as groundless as Fodor & Garrett's 'abstract link' notion of 1967, Garrod & Trabasso's (1973) case-grammar model, or Anderson's (1974) dual propositional-structure model. Like Blumenthal (1967) and so many others, Clark and the rest were attempting to explain empirical observations in terms of the way conjectured syntactosemantic entities may most neatly be handled in grammars, and that, as has been amply argued here, is fraught with inferential fallacy. Olson & Filby (1972), in addition, denied the validity of the Clark (1974) model on empirical grounds, in that they found false passives easier to verify than true ones, given an active input, whereas Clark's theory would predict additive decremental effects. James, Thompson, & Baldwin (1973), furthermore, stressed the reconstructive nature of recall, and pointedly noted that a great deal more must be found out about memory processes than is presently known, before _any_ performance model involving sentence memory can be seriously entertained.

Context of Use

The foregoing discussion of first-to-last sentence processing leads rather naturally into a review of the studies which focused on the extrasentential factors influencing the use of voice, for it was in the course of such work that many valuable insights were gained as to how sentence comprehension takes place. Underlying most context research is the basic premise that actives and passives are not really interchangeable in use, and experimental findings tend to confirm this belief, in one way or another. "Why," otherwise, "if two messages convey the same information, does the speaker choose one construction over the other?" (Prentice, 1966, p. 429).

It is pointless, however, to speak of actives and passives as being merely different ways of saying the same thing, for people seldom if ever say the same thing, and that is one of the basic tenets of descriptive linguistics. Some messages, rather, are properly expressed in a passive construction, and some in an active, as Svartvik, Johnson, and Johnson-Laird have suggested (see above); change one to the other voice, and it is no longer the same message.

Speakers do not normally stop to consider options, and listeners, of course, do not have any. Thus, to classify the transitive sentences of a language pairwise in 1:1 correspondence, as in transformational and other taxonomic grammars, provides a compact description of the language for linguists, but bears no demonstrable relation to what language users do.

Experimental research on the use of language in context and on the semantics of syntax has been going on at least since 1956 (Carroll, 1958), but the best reason for doing contextual research on active and passive voice was given by Tannenbaum & Williams: "the essential psycholinguistic distinction rests in their relative usage and derives not so much from the nature of the language code as such, but from the characteristics of the particular encoding situation" (1968a, p. 246). Listeners' pragmatic expectations, as Herriot (1969) pointed out, are by far the more potent factor in successful communication: one cannot anticipate the grammatical voice in which an interlocutor's utterance will be arrayed, but one does have the right to expect sensibleness, not only in terms of the immediate discourse context, but also in terms of common knowledge about the world. Except for Herriot's reversibility experiment, however, and its antecedents by Slobin (1966) and Turner & Rommetveit (1967a), contextual research dealt mainly with the immediate discourse context, and then, largely with manipulating and explaining the 'subject effect,' i.e., speakers' apparent predisposition to begin an utterance with what is uppermost on their mind. Some of the old unexplained phenomena of the 'complexity' era continued to haunt the scene, still demanding answers, such as: why do informants tend to give active responses to passive input, yet show no reliable evidence of 'activizing' during the process of assimilating that input? (see File & Jew, 1973).

Subjects' response predispositions were manipulated, either linguistically or pictorially, in context experiments; the linguistic independent variables were sometimes running text, sometimes single sentences, and not infrequently, isolated words. Only one study, Tannenbaum & Williams (1968a), sought to compare the effectiveness of two methods: as in many experiments, the most potent effect was the thematic subject effect, whereby predisposing the responder to think of the semantic agent facilitated his emission of active sentences, and predisposing him to think of the object facilitated the production of passives. But the interesting difference lay in how the predisposition was achieved, for the voice in which the scene-setting paragraphs were cast was not reliably correlated to response voice; it was the topic of each paragraph that seemed to be the controlling factor, again supporting the notion that pragmatic expectations are more powerful than linguistic ones. Goldman & Perfetti (1973) obtained a similar effect, in that the effective thematization of nouns as sentence-recall prompts was more a function of their centrality in paragraphs than of syntactic position in sentences; semantic agents appeared to be better prompts than objects, though this effect was confounded with a tendency to activize passive input, using the prompt noun as sentence subject.

Slobin's (1968) study was not designed to differentiate voice from other response-biasing factors, but did test full vs. truncated passives in this respect. Stories told in full passive sentences tended to be retold in active sentences, but those told in truncated passives tended to be recalled verbatim. If activization is as powerful an influence as it seems, and if subject-object inversion has any communicative reality, one might well expect truncates to be activized also, with indefinite 'dummy' agents; such, however, was not the case, across a wide range of subject ages, in the Slobin experiment. It is thus unlikely, as Slobin put it, "that a truncated passive is stored in the form of an active affirmative declarative sentence, with generalized actor, plus 'footnotes' indicating passive voice and deletion of underlying subject" (p. 877).

Slobin's concept of the communicative role of agentless passives is reminiscent of Svartvik (1966), who had found a wide range of truncated passive types, not all activizable: these findings, and those of Clark (1965), M. Johnson (1967), and Johnson-Laird (1968a, 1968b) argue powerfully against the transformational formulation of at least the voice aspects of linguistic competence, and in particular against the notion that every truncate conveys tacit agency as part of its underlying meaning. As for the tendency for subjects to activize full passives, James et al. (1973) have offered a partial answer in terms of memory reconstruction, but Slobin did point out that the fact "that it is easier for Ss to encode sentence content in the active when faced with a recall task" did not necessarily mean that it was stored that way, for "the underlying meaning of a sentence can be realized equally well in either the active or passive voice" (1968, p. 877), and he has the corroboration of Wright (1969a) and others, on that.

In their further studies of the use of voice by children, Turner & Rommetveit (1967b, 1968) used pictures to elicit sentential descriptions and to prompt sentence recalls. Simple picture scanning was a poor stimulus, producing few passives, even among nine-year-olds; asking object-focused questions and providing model sentences and prompts, however, elicited enough passive sentence completions to show a significant increase in this skill over ages. Agent-object reversibility was not a factor in the 1967b study as it had been in the 1967a and Slobin (1966) studies, for the event being described was pictorially available at all times. The Turner & Rommetveit 1968 study was a better demonstration of manipulating children's focus of attention, for actor and object pictures tended to elicit the recall of previously-stored active and passive sentences, respectively. Though there was some tendency both to recall passives in active form and actives in passive form, the former trend predominated. The effect of the thematic prominence of grammatical subjects was apparent, and the fact that pictures shown at recall time were more predictive of responses than those shown at storage time speaks for temporal recency as a factor in the immediate discourse context.

The dominant role played by sentence subjects has been a well-known 'fact' for centuries, and much of the recent experimental research bears out this belief. Huttenlocher & Weiner (1971), for example, found children to be very subject-oriented in a toy-arranging task: when one or both of two movable toys needed to be moved into place in order to fulfill a given description, the one named in the subject of the describing sentence was most often moved first; but when only one toy was allowed to be moved, the children tended to move the one named as the agent in the sentence. When the given sentence was active, the agent was the subject; but the fact that the children tended to move the non-thematic agent when a passive sentence was given suggests that they had already considered the sentence subject, and that they had perceived it as not being the one in need of moving. Longer latencies in responses to passive descriptions tended to confirm the suspicion that extra processing of some sort was going on (see also Huttenlocher, Eisenberg, & Strauss, 1968).

Experimental results were not always so unequivocal;

other work has shown that the locus of attention in sentences can be influenced by both extralinguistic and linguistic means. Carroll (1958) was able to elicit a predominance of passive responses to the question 'What happened to / was done to the X?' but only when X was a set of inanimate objects, not when X was a person. For certain real-life situations, passives are simply considered inappropriate, even though they remain grammatically possible; at times, only an active, featuring the actor, will do (e.g., 'The professor hit him'), even though the interlocutor's thematic expectations are not thereby met.

Prentice (1966) found word-sentence paired associates easier to learn when the word was a high response-strength associate of the sentence subject, whether the sentence was active or passive, and she adduced this result as empirical evidence that the most salient "verbal unit" in the immediate context is thematized in discourse, with rhematic material in sentences arranged accordingly. The passive voice, in this view, is just a way of allowing logical objects to be featured as sentence subjects, a view with which M. Johnson (1967) and Johnson-Laird (1968a) would not agree. James (1972) took exception to saliency in a sentence being solely a function of syntax, and showed evidence that imageability was the more potent factor. One must question the generality of this finding, however, for occasions can be imagined where a 'low-I' topic (such as 'occasions') needs to be commented on, and there is usually a grammatical construction in the language which assigns the focal element just the prominence it is intended to have, despite its inherent 'colorlessness.'

Mature speakers are well-acquainted with the use of 'unexpected' constituent orders as means of shifting listeners' attention from its 'normal' locus. Andrew (1974) showed that speakers can use contrastive stress patterns in combination with alternating direct and indirect object positions to vary thematic prominence, with the quantitative prosodic sound pattern usually playing the dominant role. Hornby (1972, 1974) showed that, by using passive, cleft, and pseudocleft surface orders to overthematize focal assertions, people could be induced to overlook discrepancies between non-focal assertions and actual fact; clefting, by- agency, and 'inverted' constituent order appeared to work additively in perpetrating the deception. Fletcher (1973), however, found voice and clefting to interact, such that some persons appeared to be focus-dependent in their attentional habits, others voice-dependent, and still others ambivalent with respect to both.

Intrasentential Relations

The studies reviewed hereunder were not all conducted in order to 'take voice syntax apart' and see 'what makes it tick,' but they have been selected and grouped apart because they shed some light on that topic area, and thus provide additional empirical support for Svartvik's (1966) view of voice in English as a multivariate cline of convergent syntactic and semantic factors, rather than as a simple dichotomy. The choice, in some cases, was arbitrary, for many experimental results have contextual interpretations, as well as compositional, and there is thus a great deal of cross-fertilization in both directions; the decision to group the empirical evidence thus was largely one of convenience, in any case. Again, it is Tannenbaum & Williams (1968b) who provide the keynote: " active and passive sentences differ in terms of the relative dominance of linkages between the major word units" (p. 221); to survey and elucidate what is known about these linkages is the general aim of the present thesis.

The main finding of Clark (1965), in relation to the already-mentioned left-to-right informational uncertainty effect, was a semantic dependency between verbs and object nominals which appeared to exceed that between either of these alone, or their combination as a predicate constituent, and agent nominals. There exists less choice, in other words, between what entities a given action may be done to, or conversely, what may sensibly be done to a given entity, than there is between either of these and who or what may do it. The lines of dependency in passives, however, were not the same as those in actives, nor were they a mirror image of them, as the traditional subject-object inversion view would predict: an active

1

agent-subject exerts relatively less constraint on what verb-object combination may sensibly follow it than do an object-subject and its closely constrained passive verb, on what may be appended to them in an agentive by-phrase. This relatively greater independence of passive 'victim' subjects and verbs is also reflected, of course, in the fact that agentless passives constitute 85 percent of all passive constructions in English (Svartvik, 1966), and are the only use for passives in Turkish (Lyons, 1968).

The asymmetry of lexicostructural constraints between actives and passives led Clark to conclude that the kinds of things normally talked about in the passive are not quite the same as those normally talked about in the active:

> There is an interaction between semantic and syntactic structure in active and passive sentences. It might be argued that passive sentences are generated from a different distribution of kernels than active sentences, and that the patterns of uncertainty and animateness in passive sentences are characteristic of that different distribution of kernels used in generating them. (1965, p. 369)

Using quite a different technique, M. Johnson came to a similar conclusion. Subjects rated CVC trigrams used as agent or object nouns in active and passive sentences on fifteen Semantic Differential scales (Osgood et al., 1957): CVCs used as agents were consistently rated more 'active' and 'potent' -- i.e., animate -- than syllables used as objects, but the difference was not as pronounced in passive sentences as in active. The left-to-right semantic constraint gradient, in both the Clark (1965) and M. Johnson (1967) studies was less steep in passives than in actives, and Johnson, like Clark, concluded that "since these meanings reflect underlying distributional structures, different sets of words are associated with active and passive sentences" (1967, p. 245).

Although the Clark & Begun (1968) 'sensibleness' experiments basically supported the left-to-right semantic diversity effect found in Clark (1965) and M. Johnson (1967), there was no conclusive evidence for the close verb-object relation observed in the 1965 study; rather, there seemed to be a subject-predicate split, with the subject (agent in actives, object in passives) thematically prominent in both sentence types, and not forming "a very tight unit" with "the 'information'-bearing part of the sentence [i.e.,] the surface predicate" (1968, p. 227). Clark & Begun interpreted the generally lower sensibleness ratings of passives (whose main lexical items had been interchanged with those of like sentences, in various combinations) as related to Clark's (1965) finding of greater lexical diversity in passives, and thus as support in principle for the 1965 conclusions.

Clark & Begun (1971) used the 1968 'sensibleness' procedures to elucidate the subject-verb relation in English. Transitive verb subjects (i.e., agents) were found to fit the Chomskyan semantic feature hierarchy, with [+Human], [+Animate], and [+Concrete] canonical or unmarked, in that abstract-noun subjects severely limit the choice of verb which may follow, but animate, and especially human nouns are, sometimes through personification (as in 'The map showed us the way'), used with a wide variety of verbs. The personification claim is not as far-fetched as may seem, when one considers that the case concepts 'Agent' and 'Experiencer' -- as defined in Fillmore (1971) -- were treated as intuitively clearcut semantic role relations, and were easy to learn in a concept-formation study (Shafto, 1973); 'Instrument' and 'Object,' on the other hand -- as in 'The movie was sad', and 'The ball went over the fence,' respectively -- were "relatively weak in their intuitive appeal" (p. 554).

Tannenbaum & Williams (1968b) obtained a 'thematic subject' effect similar to that of Clark & Begun (1968), but could not support the conclusions of that study, nor those of its antecedent, for they found the strongest semantic linkages to be between subject and verb, in both actives and passives: agent nouns were a better cue for the recall of verbs, and vice versa, in actives than in passives, and object nouns prompted the recall of verbs better in passives; agent-object linkages were weaker than those with verbs, as Healy & Miller also observed (1970, 1971). The results were not totally conclusive, but convincing enough to permit Tannenbaum & Williams to doubt both phrase-structure and transformational analyses: the first would predict consistently dominant verb-object ties in both actives and passives (as did Clark, 1965), and the second, of course, derives both kinds of surface structure from similar deep structures, and would predict "no basic differences in the dominant word linkages of simple active and passive sentences" (1968b, p. 221).

Hornby (1972) also obtained what might be called a subject-dominance effect, but of quite a different sort, one that calls for re-examination of the whole concept of thematic prominence. Subjects had to choose which of two pictures a given sentence "was about" when neither really was, the sentence agent being wrong in the one case, and the sentence object wrong, in the other. The sentence types that were used sampled six different 'emphasis-shifting' constructions, in addition to simple active declaratives, including passive, cleft, pseudocleft, and simple contrastive stress. In most cases, subjects chose the picture which was in harmony with the unstressed constituent of the given sentence; that is to say, the psychological subject of each sentence, to most participants, was that part not at variance with the facts, that part which a listener could safely take for granted. In simple actives and passives, this was the traditional subject, the 'leftmost' nominal, but in contrastively-stressed actives emphasizing the ('left-end') agent, the psychological subject was the rightmost constituent, the object.

The fact that the (contrastively) stressed nominal or psychological predicate was at variance in most cases with the chosen picture implies that the greater sin is to lie about what a listener is most likely to take for granted.

Hornby (1974) did in fact find that people could be deceived through the manipulation of psychological subjects and predicates, but he interpreted his 1972 results as fitting neither the Hallidayan left-right notion of theme and rheme, nor superficial subject-predicate analyses, nor deep-structural analyses of either the standard Chomskyan or Fillmorean case variety. He inferred support, rather, for the Prague School notion of topic and comment, which holds that these constitute "a separate level of analysis and are relatively independent of either the logical or superficial levels of analysis" (Hornby, 1972, p. 633). Conventional 'left-end' subjects are thus thematically prominent only in the sense that they may be 'current' or 'old' information in the discourse context, but the fact that they tend to be taken for granted, whereas 'new' rhematic material does not, forces quite a different notion of prominence into consideration.

One finding having to do with the internal semantic linkages in passive sentences which has never been adequately explained nor disconfirmed, was Blumenthal's (1967) obtaining of poorer sentence recalls to manner-adverbial noun prompts than to agent-noun prompts. Deep structure arguments aside, as well as the possible bias -- _if_ systematic! -- of nouns' imagery value, there does seem to be a weaker semantic link between what is asserted in the 'body' of a passive sentence and the adverbial modification thereof, as opposed to the specification of agency. Davidson (1969) replicated the finding, but could offer no better explanation: he obtained a slight asymmetry, furthermore, in that the transitional error probabilities of recalling manner adverbial and agent nouns, given the recall of the verb, were about equal, but there was a better chance of recalling the verb, given the agent noun was recalled, than given the recall of the manner-adverbial noun. The mutual agent-verb constraints discussed in Clark & Begun (1971), if extended to passives, might provide as good an explanation as any offered thus far.

In conclusion, a study may be considered in which as simple a matter as definiteness of noun determiner contradicts most theories of topicalization in actives and passives. Grieve & Wales (1973) had noticed that a great many experiments on voice were restricted to (a), full passives, and (b), mindlessly simple sentences with all nouns preceded by 'the' as determiner. Analysis of the kinds of questions their subjects wrote as being appropriately answered by their given sentences showed that the standard leftmost nominal was focused on as the main topic of the sentence only in full passives, and only when both agent and object nominals had definite determiners. Where one nominal had an indefinite determiner or was missing (as in truncated passives), the other, definitely determined, nominal was focused on, and when one nominal was indefinite and the other also indefinite or missing, the event (i.e., the verb) was the main locus of attention. Grieve & Wales attributed this effect to what topicalization in general is attributed to -- presupposition, or 'old' information which a speaker has reason to believe is shared by his listener(s): reference to this belief, implied by a speaker's use of 'the,' goes back as far as J. Harris' Hermes grammar of 1751 (Grieve & Wales, 1973, p. 175). The finding does not, of course, disconfirm traditionally broader concepts of topic and comment; it merely complicates them.

CHAPTER FOUR

TWO FURTHER EXPERIMENTS ON VOICE

Serial Elaboration in Sentence Processing

The foregoing two chapters have attempted to make it clear that, whatever grammatical voice is, in reality, it is no simple matter. After twenty centuries of philosophizing and twenty years of experimentation about it, a few issues have been clarified, and a few made to appear more complex than ever, but nothing has basically been changed: the conceptual and empirical problems are still legion, and there is evidence both for and against a number of disparate points of view. It is still possible, however, to detect some trends which are more persuasive than others, not only because of their inherent intuitive appeal, but because they have some empirical support, as well; chief among these, in the context of the present work, is the notion that sentences are produced and perceived linearly, in and of themselves, in first-to-last temporal order.

This is not as naive a belief as may first appear, for it commits the believer to some corollaries which are currently unpopular in mainstream linguistics. It commits one to the view, for example, that at no time during the production or perception of an utterance is there any recourse, conscious or unconscious, by the language user, to other, more 'basic' constituent orders, to missing or 'deleted' meaningful elements, or to anything resembling what currently pass for abstract representations of speakers' interpretations of sentences. To deny the relevance of grammatical deep structure, however, is not to say that utterances have no meaning; it is merely to assert that, considering the present state of knowledge about mental processes and cognitive structure in general, the invention of calculi for simulating speakers' knowledge of a language by generating abstract representations of its sentences seems a little premature.

Belief in linear processing admittedly involves a certain measure of faith, at this point in history, but there is enough empirical evidence in its favor, as well as philosophical argument, to make the investment worthwhile. A great deal of attention was devoted in Chapter Two, above, to the inherent sterility of generative-transformational accounts of linguistic competence, and to the historical inadequacy of the subject-object inversion principle, in particular, to account for anything but grammarians' desires for descriptive economy. Those arguments will not be repeated, for the empirical evidence against transformational processes in ordinary language use has been thoroughly reviewed here also, in Chapter Three. What remains, once transformation-based cognition models have been rejected, is the nested linear constituent view of sentence structure espoused by pretransformational descriptivists and a few psycholinguists: the empirical evidence in its favor is still persuasive, and it has the added advantage of providing for a fairly direct (and thus economical, in a different sense) account of the way sentences are known to be heard by children, and thus presumed to function as the only data they have, on the basis of which to formulate their 'mental grammars' (Watt, 1970).

The serial elaboration concept in general includes the notion that, in subject-verb-adjunct clauses, at least, a speaker seems to have more postverbal options than preverbal ones. To frame the notion in terms of observed active and passive occurrences, the variety of predicate constructions that are used generally exceeds that of subject constructions: "one of the motivating factors in selecting the passive in favour of the active," Svartvik found, "is the preference for placing heavy nominal groups at the end of sentences" (1966, p. 157; see pp. 99ff., above). That this concept of sentence structure requires some sort of commitment to Yngve's depth hypothesis should be fairly obvious, for what is being endorsed is the proposal that 'left-branching' or regressive constructions are commitment-building, and hence generally avoided by speakers, but that 'right-branching' or postponement manoeuvers are virtually unconstrained. Once transformationalism has been rejected as incapable of dealing with man as a memory-equipped device, there is no alternative but linear processing for sentence production models, and Yngve's is the most plausible to date; empirical support for it has been equivocal, but it still holds out possibilities (Fillenbaum, 1971), and could serve as a general theoretical framework within which to test specific structural-cognition hypotheses.

A Transformationless View of Passives

There has been a trend in recent years towards abolition of the passive transformation in grammars of English (see pp. 75ff., above). Except for one or two very recent proposals, however (see Chapter 5, below), this trend has not meant a denial of the well-known active-passive relation, for the subject-object inversion continues to hold grammarians' allegiance; it is just that greater descriptive economy can be achieved by letting other better-motivated rules accomplish the same (or equivalent) derivational manoeuvers, piecemeal. Thus, while the classical passive transformation may no longer be an explicit rule, in some grammars, its analytic consequences are still very much in evidence. One of the features these recent 'passiveless' grammars have in common, and which distinguishes them from earlier analyses, is the assignment of special status to *be* as the pivotal element in existential assertions, with nominal, adjectival, and participial expressions serving more or less equally as postverbal complements. Insofar as these formalisms can be interpreted as attempts to account for the way in which be predications are conceived and understood in English, they may be taken as intuition-based hypotheses concerning speakers' sentence cognitions; with some fleshing out in the form of empirical consequences, they might lead to viable experimental hypotheses, as well.

Similar proposals for revising entrenched concepts of the voice phenomenon have also come, and with somewhat greater persuasiveness, from the domain of empirical research. Svartvik, for example (see pp. 95ff., above), suggested, on the basis of constructional imbalances and inter-type occurrence discrepancies, that some passives might better be conceived of as members of an "equative" or intransitive active clause paradigm, rather than transformationally related to some underlying transitive active, which in many cases does not exist. Watt (1970, 1974), furthermore, has proposed an analysis of the be -- V+ed construction which is much more compatible with the known facts of language acquisition by children, and with the serial elaboration concept outlined above, than is any transformational view. Having noted that the greater performative simplicity of truncated passives versus full passives was not in accordance with predictions based on transformational complexity, Watt suggested that the economy criteria through which language learners optimize their mental grammars may be quite different from those which grammarians apply to their theory construction:

> The chief difference between [linguists' Competence Grammar] and [the Abstract Performative Grammar] boils down to this: the CG puts a premium on overall economy and so makes all significant generalizations; and the APG puts a premium on economy of derivation of individual sentential paradigms, and so balks at incorporating some of these generalizations. (1970, p. 187)

Since children apparently use agentless passives long before they use full ones, Watt suggested that the former might well be, at some stage, not differentiated by their users from simple be predications of the form NP-(Aux)- be--PRED, where PRED can be realized as one of:

(a) a [+PRED +VB -ADJ] verb, e.g., 'writing'

(b) a [+PRED -VB +ADJ] adjective, e.g., 'pretty'

(c) a [+PRED +VB +ADJ] participle, e.g., 'surprised'

A large variety of superficially and perhaps semantically similar sentences can thus be accounted for, in three-year-olds at least, by a simple, direct set of formation rules which involve no utterance-type transformation at all. In view of this, and of the apparent simplicity of truncates in adult performance as well, Watt found it counterintuitive and "somewhat lacking in plausibility" that the child later:

> forego the simplicity of his (putative) original derivation of the truncates in order to achieve a simplifying generalization holding for truncates and full passives together; it is to insist that he give up a simple way of deriving the set of sentences x because, when he acquires the set y, the set (x, y) can be more simply derived if he uses the necessarily more complex derivation of y to derive x also. (1970, p. 185)

To carry the argument a step further: if the language learner eschews unnecessary complexity in his mental grammar with respect to truncates, why should he embrace the "necessarily more complex derivation" of full passives with such equanimity? Surely, mere formal describability does not guarantee performative relevance in the one case any more than in the other. Full passives are admittedly more complex than simple active predicatives, if only because they are longer, but it does not necessarily follow that passives are ever produced or understood as transforms of active-like deep structures (Maratsos & Abramovitch, 1975). Since the child must eventually learn to elaborate some of his basic predicative utterances through a variety of right-branching constructions, why not all of them? An agentive by-phrase is structurally no different from locative or manner-adverbial phrases, and having to learn that type (c) predications (above) permit the postverbal specification of agency adds little to the general cognitive clutter of postverbal adjunction which must eventually be sorted out, in any case.

Within the overall serial elaboration framework, then, passive declaratives may be regarded as an instance of be predication, so that sentences such as the following belong to the same formal and illocutionary paradigm, as far as the average language user is concerned:

(a) John was (absorbedly) writing (poetry) (for Mary) (by the river).

(b) John was (extremely) handsome (by all accounts).

(c) John was (instantly) elated (by the good news).

(d) John was (eagerly) looked up to (by his classmates).

This 'VP-expansion' view of sentence elaboration, it should be noted, accounts directly for the differential performative complexities of both full and 'unelaborated' passives, and is at least as plausible a processing model as any transformational account. There may well be no psycholinguistic evidence that speakers do not, on the basis of the paraphrastic 'facts,' incorporate quasi-transformational economies into their mental grammars, but then, grammarians' intuitions about what speakers must necessarily 'know' hardly constitute empirical evidence that they do. To obtain the beginnings of such empirical evidence was the goal of the present enterprise.

The Independence Hypothesis

With all of the ramifications of the serial processing concept, it would be foolish to attempt to demonstrate the phenomenon except in stepwise fashion; attention will therefore be given only to its principal implications. Taking for granted, first of all, that what is said in a sentence is lexically sensible and appropriate to the situation, the chief syntactosemantic requirement of left-to-right elaboration, insofar as it affects the voice phenomenon, would seem to be a certain amount of independence among the major constituents. Whereas "the traditional conception of the distinction between an active and a passive voice rests upon the assumption that the three conditions [subject-object permutation, be...-ed and by insertion] will generally coincide," Lyons has suggested (1968, pp. 376-7), the three domains of variation "are to some degree independent of one another," as follows:

1. Preverbal domain. The leftmost nominal expression, usually construed as the subject or topic of the utterance, is dependent on the following verb phrase for its semantic interpretation as a 'doer' or 'receiver,' for it is formally undistinguished from any other nominal, in English (Johnson-Laird, 1974, pp. 144-45). Its interpretation, furthermore, is not unequivocally signalled by verb-phrase construction, for 'the door' in 'The door slammed shut' and 'the books' in 'The books are selling like hotcakes' are presumably logical objects, although this role must be inferred -- if indeed it consistently is (cf. Shafto, 1973) -- from a formally active verb phrase. Nominals preceding passive verb constructions are presumably always interpreted as objects of some sort, but this matter is commented on further, below.
2. Intraverbal domain. Ignoring modal auxiliaries for the sake of simplicity, the main English verb phrase types are enumerated by the ordered sequence Tense--(have...-ed)--(be...-ing)--(be...-ed) -- Main Verb, with the affixes appropriately 'shifted' to the right (Chomsky, 1957, pp. 39ff.). That the passive

be plays a rather special role, there can be no doubt, for its presence or absence in the verb phrase is crucial to the semantic interpretation of the preceding nominal, and it affects the kinds of postverbal adjunction which may sensibly follow, as well. The transformational treatment of the passive auxiliary has already been shown, however, to be both empirically equivocal and grounded in fallacy, and nothing further will be made of that matter here; an alternative view of the passive be and its complements has been outlined above. The existence of formal and semantic ambiguity in English verb phrases has also been alluded to, in that the occurrence of the past-participial form is governed by both perfective have and passive be, and is furthermore formally indistinguishable in many cases from the simple past tense form (Reid, 1974b); children seem to confuse these forms (Menyuk, 1963), and some experimental clarification of their interaction seems in order.

3. Postverbal domain. It is here, according to the serial hypothesis, that there should be a wide range of available choices, and a cursory inspection of the sentences of English bears this out: passive verb phrases may be followed by:

(a) nothing at all, or, to name but a few options,

(b) a nominal or adjectival expression after certain verbs such as 'elect' and 'consider;' an infinitival verb phrase after such verbs as 'advise;' and/or one or more prepositional phrases -- one of which may be agentive -- or an adverb, or some combination of these.

Active postverbal adjuncts may also include (a), above, if the verb is intransitive; indirect and/or direct object nominals; and, excepting agentive by -phrases, the options enumerated in (b), above. The grammar of postverbal adjunction is amply described in the grammatical literature, and will not be dwelt upon further here; it is not crucial to the present work, which is concerned mainly with simple active and passive declaratives and their basic postverbal options, the object nominal and the prepositional phrase.

It was on the basis of grammatical intuitions such as these that a first experimental hypothesis was developed and tested.

Experiment 1

Introduction

As a first step towards describing the superordinate sentence type of which passives seem to be a cognitive subclass, an attempt was made to gain empirical support for the independence hypothesis outlined above, and to discover whether there is a hierarchy of dominance among the presumed overt signals of voice in declarative affirmatives. It was assumed, contrary to what the transformational hypothesis implies, that the three markers of passive locution are to some extent independent of one another. That is to say, direct object as sentence subject, passive aspect in the verb, and agentive by-phrase as postverbal adjunct are neither universal nor unequivocal as the distinguishing features of the 'marked' voice, for the following reasons (cf. Lyons, 1968, and above):

(a) object NPs occur as sentence subjects in pseudo-intransitive and intransitive ergative sentences, not to mention the notorious 'John is easy to please'-type predicatives (Chomsky, 1964, p. 61);

(b) passive aspect in English verbs is signalled by be and -ed, one of which is homophonous with one of the markers of progressive aspect (be), and the other with the inflection for perfective aspect and, except in irregular verbs, the simple past tense (-ed);

(c) agentive by-phrases can be interchanged with or adjoined to adverbial by-phrases, with little loss of general illocutionary meaning, or dispensed with altogether, yielding so-called 'truncates.'

No such asumption was required with respect to actives, because transformational grammars do not treat them as a unitary phenomenon, the way they treat passives.

The conjunctive concept formation (CCF) procedure was decided on as the best method of eliciting graded salience judgments on apparent sentence properties, while at the same time treating all properties as equally available, without bias. Previous applications of this technique with sentences systematically varied in form had shown that subjects can learn to discriminate, in stepwise fashion, one particular conjunction of sentence type features, and thus provide quantitative data concerning perceived dominance relations among the syntactosemantic attributes of sentences (Baker et al., 1973; Reid, 1972, 1974b). In the 'response method' application of CCF (Deese & Hulse, 1967), the learning of a single many-to-one correspondence relation is sought, between an abstract, multidimensional class concept and a number of positive instances of that class's membership. Stimulus objects -- in this case, sentences -- are presented serially, in random order, to the informant, who expresses a judgment as to whether each item in turn is or is not a member of his 'secret' target category. With immediate reinforcement concerning the correctness of each judgment, subjects learn, by trial and error, what kinds of objects belong to their assigned concept class and what kinds do not, and eventually respond correctly to all presentations.

In order to keep the experiment within manageable proportions, only the most cogent syntactic variables were investigated -- passivization, perfectivization, and postverbal adjunction. Intraverbal phenomena were focused on at the expense of preverbal (subject) factors, for two reasons:

(a) while logical objects may occur as the subjects of non-passive sentences, passivized verbs are never preceded by anything else, and experimental manipulation is thus precluded;

(b) investigations of the semantic salience of subject NPs in various sentence types suggest that it is strength of associative bonding in noun-verb collocations that plays the dominant role, not inter-sentence-type syntactic relations *per se* (Slobin, 1966; Blumenthal & Boakes, 1967; Clark & Begun, 1971).

Stimulus variation with respect to sentence subjects (i.e., agent vs. object) was thus strictly in accordance with sentence voice -- active or passive -- and hence correlated with the absence vs. presence of *be*...-*ed* in the verb phrase.

Active and passive sentences were further differentiated by the absence vs. presence of perfective *have*...-*ed* in the verb phrase, and also by the insertion of either a *by*-phrase or a non-*by*-phrase adjunct in postverbal position. The latter variable restricted the selection of main verbs to those transitives which may occur intransitively without changing their meaning, such as *eat*, *knit*, *paint*, and the like. *By*-phrase constituents were the usual agentive *by*-phrases in the normal passive sentences, but locative and manner adverbials in the *by*-phrase actives. Direct objects served as the non-*by*-phrase adjuncts for the remaining (normal) actives, and adverbial phrases with prepositions other than by completed the agentless passives. Postverbal adjunction was perforce a within-voice variable, and thus not entirely independent. Tense was deliberately covaried with perfectivization -- imperfectives in past tense, perfectives in the present -- so as to maintain the has/have subject-verb agreement variation, as well as the was/were, in auxiliary verb phrases.

The eight sentence types used in the experiment were as follows:

1. IAO: (past) Imperfective Active with Direct Object:
   e.g., Some clever rustlers stole our cattle.
2. IAB: (past) Imperfective Active with adv. by-phrase:
   Some clever rustlers stole by moonlight.
3. PAO: (present) Perfective Active with Direct Object:
   Some clever rustlers have stolen our cattle.
4. PAB: (present) Perfective Active with adv. by-phrase:
   Some clever rustlers have stolen by moonlight.
5. IPO: (past) Imperfective Passive with other adv. phrase:
   Our cattle were stolen off the south pasture.
6. IPB: (past) Imperfective Passive with agentive by-phrase:
   Our cattle were stolen by some clever rustlers.
7. PPO: (present) Perfective Passive with other adv. phrase:
   Our cattle have been stolen off the south pasture.
8. PPB: (present) Perfective Passive with agentive by-phrase:
   Our cattle have been stolen by some clever rustlers.

With 128 such sentences -- sixteen instances of each type --

presented in random order, it seemed fairly reasonable that passivization, perfectivization, and postverbal adjunction ought to be independently available for use as parameters of a conjunctive sentence-type concept. Failure to form such a concept in the usual wholistic conservative focusing fashion typical of CCF experiments (Deese & Hulse, 1967) would, of course, deny the utility or salience of these syntactosemantic features to the average speaker of English.

In general, a left-to-right processing tendency was expected. In the absence of any particular anticipatory set or experimental effect, the intraverbal features of the CCF target sentence-type -- whichever that was, for any subject -- ought to have been distinguished first, and its postverbal characteristics last. The means of the 'last-error trials' (LETs) and yes-response category frequencies (Baker et al., 1973; Reid, 1972, 1974b) were therefore expected to be rank- ordered as follows:

TENSE+PERFECTIVE error ≤ VOICE error < BY-PHRASE error

The distributional facts of English would predict the same rank-ordering: since both active and passive sentences may occur with no postverbal constituent at all, intraverbal aspect would seem to be the sine qua non. In addition, the sentence types with minimally-expanded verb phrase (non-perfective and non-passive, e.g., stole) should be easiest to identify, due to their obvious brevity; this would tend to minimize the difference between Voice error and Tense+Perfective error. Those sentences characterized by maximal expansion of the verb phrase (perfective _and_ passive, e.g., _has/have been stolen_) ought also to be readily distinguished, but to a lesser degree than the simple past verbs, due to the possibility of partial confusion among, e.g., _has/have stolen_, _was/were stolen_, and _has/have been stolen_, as characteristic verb phrase types.

What was being sought in the experiment, in other words, was empirical confirmation of what is, to most linguists, so patently self-evident as to obviate further investigation. Far from being a vacuous enterprise, however, such validation of putative data is a methodological necessity in science; it is particularly necessary in linguistics, where true external constraints on grammatical descriptions are, contrary to prevailing claims, few and far between (Prideaux, 1971; Prideaux & Baker, 1974). Besides, any elucidation of the partial synonymy among auxiliary verbal aspects could not but be informative, for the strictly formal basis on which the now generally-accepted AUX-rewrite rule of deep structure was written has never been subjected to native-speaker scrutiny.

Method

Materials. There were sixteen instances of each sentence type described above, making 128 different stimuli (see Appendix A). The sixteen lexical content sets that were used each consisted of:

(a) a transitive verb of the type that may occur with or without postverbal adjunct;

(b) a pair of semantically plausible, non-interchangeable agent and object NPs for each verb;

(c) equally plausible adverbial phrase substitutes for those NPs, for use in the objectless by-phrase actives and the agentless passives, respectively.

NPs consisted of two, three, or four words, including a determiner and a head noun, with zero, one, or two adjectival or participial attributives in between. NP lengths were equally distributed throughout the lexical sets, both pre- and postverbally, as were singularity and plurality in the head nouns, and definiteness vs. indefiniteness in the determiners, all in completely uncorrelated patterns. The adverbial phrases were equal in word length to their substituends, including the prepositions.

The 128 sentences were arranged in a basic randomized presentation order similar to that used in Reid (1972). There were eight successive blocks of sixteen sentences, each block comprising one sentence of each lexical content, with each syntactic type occurring once in every eight. No syntactic type or lexical content ever occurred twice in succession. Every block pattern was unique, and was determined as far as possible at random, with the restriction that the eight blocks each have a different syntactic type in position four; with cyclic presentation, the various groups of experimental subjects could each start with a different block, and all subjects would thus encounter their first positive instance in their fourth trial. Once these distributional restrictions on type and content had been set, the selection of specific sentences to fill the slots was at random.

Procedure. The experiment was administered by computer. Subjects were seated at one of several IBM 2741 typewriter terminals in a computing laboratory, all communicating with the University of Alberta Computing Services' 360/67 system. The goal of the procedure, already mentioned above, was to elicit yes/no judgments as to the target-class membership of serially-presented stimuli in turn, with immediate correct/wrong reinforcement providing clues for the eventual formation, by the subject, of a three-dimensional sentence-type concept. After printing out instructions and illustrative examples (see Appendix B), the computer presented sentences cyclically from the basic randomized list, one sentence per trial, for judgment. Subjects entered a 'yes' (Y) or 'no' (N) response to the machine after each presentation, reflecting their current concept of the target sentence type and of that sentence's membership in it. The computer reinforced the response immediately, printing 'correct' or 'wrong' in accordance with the target sentence type assigned to that subject.

Sentence presentation ceased when 24 consecutive correct responses had been made, thus ensuring that the subject had correctly identified at least two successive occurrences of his target type, as well as twenty or more non-target sentences. Subjects were then asked to type in, without looking back at the printed material, an intuitive description of their target sentence type, and a brief account of how they had arrived at the solution. If the concept-formation criterion had not been reached within an hour or so, program execution was terminated, and that experimental condition was rerun later, with another subject.

Subjects and design. Forty-six University of Alberta undergraduates (mean age, 20.3; mean years of education, 13.6) volunteered as subjects, in response to a campus-wide appeal by poster. Six, chosen afterwards by lot, were paid five dollars for their services. Fourteen of these subjects were unable to complete the task; their data were excluded from the main analysis, but are summarized, below.

The experiment was analyzed as a five-factor factorial, with repeated measures on the within-subjects response category factor. The between-subject factors were target Voice (VCE), target tense+perfective (TPV), target postverbal adjunct within Voice (PVA), and Sex, each at two levels. Two subjects were assigned at random to each of the sixteen subgroups.

The primary data were the proportions of 'yes' responses (expressed as a percentage of total trials) made by each subject to the eight types of stimulus sentence presented for judgment. For analysis, these percentages were redistributed within each subject so as to represent his/her acquiescence to: (1), sentences of the assigned target type; (2), sentences differing from target type only in the TPV aspect; and so on, through (8), sentences differing from target in all three syntactic dimensions. The within-subjects variable was thus converted to a 'yes-errors' factor (ERRs), with correct yes-responses to target-type sentences comprising the 'null' error category. 'No' responses, being uninterpretable, were ignored (see Baker et al., 1973; Reid, 1972, 1974b).

Results

Subjects' trials-to-criterion (TTC) counts were, as expected, highly variable, ranging from 31 to 212, with a mean of 95.6 and a standard deviation of 48.6. The mean TTC for female subjects was 79.3, whereas that for males was 111.9; this difference, however, was not statistically significant.

A mixed-model repeated measures analysis of variance was performed on the 'yes-error' percentage distributions; the results are shown in Table 1. Three variance components were significant at the .01 level or better: the Tense+Perfective and Yes-errors main effects, and the Voice X TPV X ERRs interaction. The independence of the first two was vitiated by the third, as was the just-significant TPV X

Table 1
Analysis of Variance: Yes Responses as a Function of
Sex, Target-type Feature, and Yes-error Type,
Experiment 1.

Source	SSq	df	MSq	F
Voice (V)	1.86	1	1.86	0.61
Tense & Perfectiveness (T)	30.02	1	30.02	9.81**
Postverbal Adjunct within V (P(V))	11.87	2	5.94	1.94
Sex (S)	2.34	1	2.34	0.76
V X T	4.59	1	4.59	1.5
V X S	3.91	1	3.91	1.28
T X P(V)	6.22	2	3.11	1.02
T X S	0.06	1	0.06	0.02
P(V) X S	19.70	2	9.85	3.22
V X T X S	0.08	1	0.08	0.03
T X P(V) X S	7.68	2	3.84	1.26
Ss(V X T X P(V) X S)	48.97	16	3.06	
Yes-error types (E)	1474.90	7	210.70	83.98***
V X E	29.37	7	4.20	1.67
T X E	48.09	7	6.87	2.74*
P(V) X E	25.59	14	1.83	0.73
S X E	7.80	7	1.11	0.44
V X T X E	70.80	7	10.11	4.03***
V X S X E	39.09	7	5.58	2.23*
T X P(V) X E	23.97	14	1.71	0.68
T X S X E	11.72	7	1.67	0.67
P(V) X S X E	16.26	14	1.16	0.46
V X T X S X E	5.32	7	0.76	0.3
T X P(V) X S X E	25.42	14	1.82	0.72
Ss(V X T X P(V) X S) X E	280.99	112	2.51	

* $p < .05$ ** $p < .01$ *** $p < .001$

ERRs interaction. With 112 degrees of freedom for the within-subjects error mean square, the also-significant Voice X Sex X ERRs interaction ($p \leq .05$) was probably of marginal import.

Figure 1 is a graph of the crucial Voice X TPV X ERRs interaction. It is readily apparent that one TPV X Voice combination in particular occasioned deviant

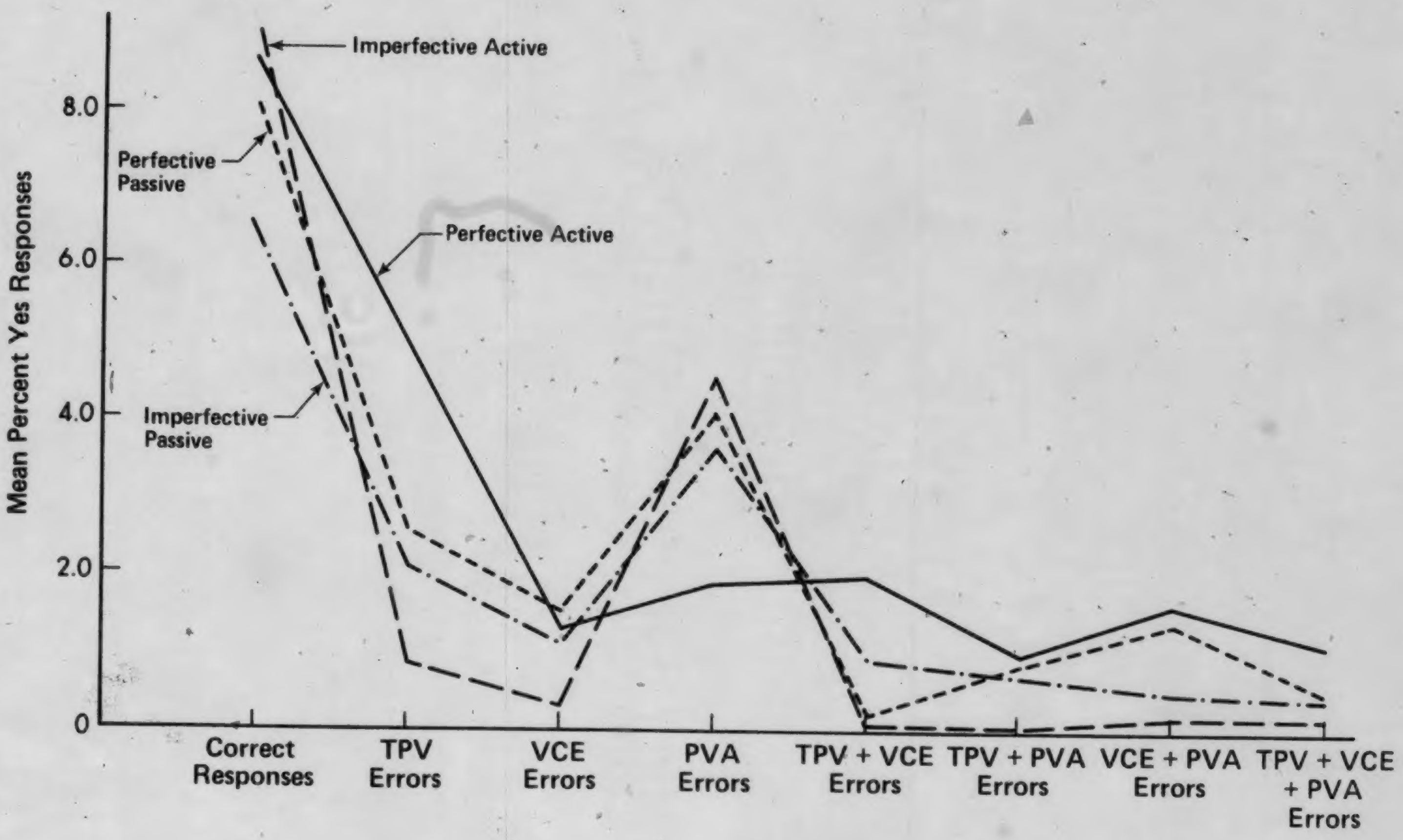


Figure 1. Mean percent yes responses as a function of target Tense/Perfectiveness (TPV), target Voice (VCE), and correctness of response, Experiment 1.
Note: "PVA" = Post-Verbal Adjunct.

type-recognition performance: the (present) perfective actives, irrespective of postverbal adjunction. Imperfective actives, and all passives in general, occasioned 'mistaken identity' responses in accordance with expectations, i.e.,

VCE errors ≤ TPV errors < PVA errors

(see p. 176, above). The perfective actives, however, engendered a partial reversal of the (intraverbal aspects) < (postverbal adjunction) trend, i.e.,

VCE errors ≤ PVA errors < TPV errors.

In other words, active sentences of the general form Agent NP has/have V+ed PVA were seen to be more like sentences of the form Agent NP V+ed PVA than like passives of either the form Object NP was/were V+ed PVA or Object NP has/have been V+ed PVA. Postverbal adjunction within the perfective actives (i.e., direct object NP vs. adverbial by + NP phrase) also occasioned relatively little confusion.

Imperfective actives, on the other hand, were frequently confused with respect to their postverbal components. That is, sentences of the type Agent NP V+ed Object NP tended to be characterized as very much like those of the form Agent NP V+ed by NP. These one-word verbs, however, were easily distinguished from their two-word Voice or TPV variants, namely, Object NP was/were V+ed PVA or Agent NP has/have V+ed PVA. The same was true of all the passive target types, though less markedly than with the imperfective actives. That is, sentences like Object NP has/have been V+ed PVA and Object NP was/were V+ed PVA were easier to distinguish from each other than was either type from its PVA variants, ending with either by + Agent NP or Prep + NP.

As in the Baker et al. (1973) and Reid (1972) CCF experiments, the relative proportions of confusion error seemed to reflect the temporal order of concept-dimension acquisition, in that the sentence-form variation occasioning the most error was adverted to last, by most subjects. Table 2 shows the distribution of mean 'last-error trials' (LETs): this distribution differed significantly from what could be expected to occur, on the basis of pure chance ($\chi^2(4) = 10.5$, $p < .05$). LETs were those trials -- expressed as a percentage of TTC -- after which subjects made no further yes-response to sentences of the wrong TPV, VCE, and PVA constitution, respectively. The active target types were neatly dichotomized, as already noted, with PVA differences being noticed last by subjects with imperfective active targets, and TPV differences last by those with perfective active targets. Voice and TPV differences were resolved very early, it is further apparent, when an imperfective active type (with one-word verb) was the target, at nine percent or less of TTC. With PAB sentences as target, however, concept acquisition did not begin until past fifty percent of TTC, on the average; it began much earlier, with PAO targets, but TPV resolution took longest for both PAO and PAB types.

Table 2
Mean Last-Error Trial Percentages
for each Target Syntactic Feature, as a Function of
Assigned Target Sentence Type, Experiment 1.

Target Sentence Type	Last Tense+ Perfective Error	Last Voice Error	Last PV Adjunct Error
Imperfective Active + D. Object	5.0	0.8	55.9
Imperfective Active + By-phrase	8.7	5.6	46.6
Perfective Active + D. Object	65.2	29.2	25.8
Perfective Active + By-phrase	70.8	60.3	54.2
Imperfective Passive + other phr.	38.6	20.5	54.0
Imperfective Passive + By-phrase	52.3	46.7	35.1
Perfective Passive + other phr.	32.8	45.8	30.1
Perfective Passive + By-phrase	32.0	26.5	51.9

The passive target types presented a somewhat more confused LET picture than their profile similarity in Figure 1 -- based on yes-error percentages -- would lead one to believe. Only two target types, IPO and PPB, produced mean LET orders resembling those of the imperfective actives; one of the remaining types, PPB, was more like the deviant perfective actives in its mean LET order than like the other passives. This apparent lack of correlation can be explained to some extent by rather wide variation among individual subjects.

A hierarchical cluster analysis (Veldman, 1967) of the subjects' yes-error vectors revealed three basic CCF performance patterns, each one reflected in the associated LET means and response-pattern means, but rather poorly correlated with target sentence type (see Table 3). The first major cluster of subjects was characterized by a

Table 3
Principal Groupings of Experiment 1 Subjects Resulting from Hierarchical Cluster Analysis of their Yes-response Patterns,[1] also showing Last-error Trial (LET) Percentages.

Target Type[2]	Correct resp.	TPV err.	VCE err.	PVA err.	TPV+ VCE err.	TPV+ PVA err.	VCE+ PVA err.	TPV+ VCE+ PVA err.	TPV LET	VCE LET	PVA LET
Group 1a:											
IAO	11.1	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0	0	56
IAO	9.7	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0	0	23
PPO	11.4	0.0	2.9	2.9	0.0	0.0	0.0	0.0	0	31	20
IAO	12.3	1.5	1.5	6.2	0.0	0.0	0.0	0.0	20	3	63
IAB	11.8	0.0	0.0	5.9	0.0	0.0	0.0	0.0	0	0	29
PPB	10.2	1.7	3.4	6.8	0.0	0.0	1.7	0.0	17	42	59
Means:	11.1	0.5	1.3	4.8	0.0	0.0	0.3	0.0	6	13	42
Group 1b:											
IAO	5.1	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0	0	82
IAB	8.0	0.0	0.0	6.2	0.0	0.0	0.9	0.0	0	7	79
PPB	8.8	0.0	0.0	6.3	0.0	0.0	1.3	0.0	0	9	63
IAB	5.6	0.0	0.7	4.2	0.0	0.0	0.7	1.4	13	15	78
IPO	3.3	0.5	0.9	5.2	0.0	0.0	0.5	0.0	15	10	88
IPO	3.3	0.0	0.0	5.6	1.1	1.1	0.0	2.2	72	72	72
Means:	5.8	0.1	0.3	5.7	0.2	0.2	0.6	0.6	17	19	77
Group 2a:											
IAB	7.3	4.9	0.0	0.0	0.0	0.0	0.0	0.0	22	0	0
IPB	7.7	4.1	1.2	0.6	0.6	0.0	0.6	0.0	81	24	5
PAO	10.9	4.7	1.6	0.0	1.6	0.0	0.0	0.0	44	9	0
PAB	10.8	5.4	0.0	2.7	0.0	0.0	2.7	0.0	35	22	22
PPO	9.4	3.1	1.6	3.1	0.0	0.0	1.6	0.0	44	63	19
PAO	8.3	1.7	0.0	0.8	0.8	0.8	0.0	0.0	80	5	38
IPO	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0
IPB	6.4	1.3	2.6	1.3	0.0	0.0	0.0	0.0	30	37	8
PAO	7.5	7.5	0.0	1.7	0.8	0.8	1.7	1.7	80	36	24
PAB	6.9	6.9	0.7	0.0	0.7	0.0	2.1	0.7	83	62	62
IPO	7.5	4.8	0.0	3.4	0.0	2.1	0.0	0.0	57	0	56
PPO	4.4	4.4	0.0	2.2	0.0	0.0	0.0	1.1	62	27	27
PPB	5.2	5.2	1.0	2.1	0.0	0.0	1.0	1.0	71	39	39
Means:	7.7	4.2	0.7	1.4	0.4	0.4	0.7	0.4	54	25	23
Group 2b:											
PAO	10.9	4.7	2.3	2.3	3.9	1.7	0.8	2.3	57	66	41
PAB	7.2	6.4	2.4	2.4	3.2	2.4	1.6	1.6	80	73	46
PAB	6.7	3.1	3.6	5.2	4.6	2.6	3.6	2.6	85	85	88
PPO	6.3	3.1	3.1	3.1	1.6	1.6	3.1	1.6	25	63	55
IPB	6.7	2.2	2.2	5.6	4.4	0.0	1.1	1.1	54	54	52
IPB	8.3	4.2	2.1	7.3	1.0	2.1	2.1	0.0	45	71	75
PPB	8.9	2.2	0.0	6.7	0.0	4.4	2.2	0.0	40	16	47
Means:	7.7	3.6	2.3	4.7	2.7	2.1	2.1	1.3	55	61	58

(Continued)

Table 3 (Continued)

[1] TPV = Tense & Perfectiveness; VCE = Voice; PVA = Postverbal Adjunct.

[2] I = Imperfective; A = Active; B = By-phrase complement; P = Perfective; P = Passive; O = Other verb complement.

---

predominance of PVA error, with other kinds of error virtually nonexistent; the two subclusters (Groups 1a and 1b) were distinguished by relatively low and high mean TTCs, respectively. Mean LET values echoed the yes-error patterns, showing that these subjects resolved the TPV and VCE distinctions relatively early, but took much longer to advert to the PVA difference. Nine of these twelve subjects had an imperfective sentence type as target.

The subclusters of the second major cluster had somewhat less in common, their main feature being predominance of perfective sentence types as target -- 8 out of 13 and 5 out of 7, respectively. Subjects in the larger subcluster (Group 2a) made mostly TPV errors within the verb phrase, and few PVA or VCE errors; predictably, they resolved the latter distinctions first, and took longer to become aware of the TPV difference. Subjects in the last subcluster exhibited a diffuse error pattern, erring substantially in all categories, with PVA error predominating somewhat; their LET means were much alike, indicating no coherent tendency among the members of this subgroup, most of whom had a perfective sentence type as target. In no subject cluster was PVA error correlated with the PVA dimension of the assigned target type.

Among those subjects who were unable to complete the task within an hour, there seemed to be a predominance of males (10 out of 14), four of whom had been assigned target type 5. Two of these four, however, were still making yes errors in all categories when their experimental session was terminated, and they apparently had no idea of any of the characteristics of their target sentence type; all other subjects who failed to finish had stopped making yes errors in at least one of the grammatical-feature dimensions. The overall distribution of these male and female 'failure' subjects as a function of target types was not significantly different from chance ($\chi^2(7) = 10.73$; $p > 0.1$).

Discussion

Subjects' response patterns in this experiment seem to have been highly idiosyncratic, with their personal biases interacting in varying degrees with the grammatical properties of the sentences, as they perceived them. At one end of the scale, as it were, there seemed to be a convergence of personal and grammatical factors, such that having imperfective active target types -- with one less auxiliary verb, in all cases -- seemed to facilitate the task for those who seemed inclined to 'see' formal verb-phrase differences readily. Proceeding down this scale, however (see Table 3), inter-subject profile similarity with respect to yes-error pattern became less and less, and the subject clusters correspondingly less and less cohesive, while at the same time subjects' assigned target type became more and more predominantly a perfective sentence type. This divergence suggests, on the one hand, that the formal and semantic differences between verb phrases with have...-ed and those without are for some reason inherently less obvious, but the lack of any systematic correspondence (beyond these general trends) between the hierarchical subject clusters and subjects' assigned target types leads to the conclusion that many people cannot readily be made aware of these kinds of linguistic structure.

The finding of two basic types of subjects -- the form-oriented and the meaning-oriented -- is not at all unusual, as Baker & Prideaux (1975) and Fletcher (1973) will attest, and it is further supported in the present case by the response-pattern means (Table 3). The first two subclusters of subjects had very similar yes-error and LET patterns. The second subcluster, however, had much the higher TTC mean (133.7 vs. 46.3), and generally higher LET means, as if it had taken them longer to 'catch on;' once they had done so, however, they resolved the intraverbal differences first, and the postverbal much later, as had the first subgroup. Why it took the second subgroup longer to get started can be seen in the fact that the proportion of erroneous 'no' responses ~~is~~ much greater in that subgroup than in the first (6.5 percent vs. 1.1 percent), indicating that these subjects frequently failed to recognize target-type sentences when they were presented. The third and fourth subclusters also exhibited a tendency to miss target-type sentences (4.7 percent), but these subjects were more accurately characterized by a marked increase in false recognitions (yes errors): these amounted to 18.7 percent of total responses in the fourth group vs. 6.9 percent in the first group.

In sum, there appear to have been two major sources of difficulty, whether occasioned by sentential structure and meaning itself or by speakers' predispositions theretowards, in the process of arriving at a three-dimensional sentence-type concept: the perfective vs. imperfective and by-phrase vs. other adjunct alternations. Conspicuous by its absence was difficulty in distinguishing actives from passives: the least LET mean for four of the eight target groups was in the voice dimension, with the tense-perfective LET mean only a little greater; for three of the remaining four groups, postverbal adjunct was distinguished first, on the average, and voice second (see Table 2). In only one target group, the PPO, was the voice alternation resolved last, and even then by only two of those four subjects (who, as a matter of interest, were distributed evenly throughout the hierarchical error-response analysis shown in Table 3). Difficulty with voice cannot thus be attributed unequivocally to the fact that the PPO subjects were looking for passives with other postverbal adjuncts than their 'usual' agentive by-phrase, for two of the four PPO subjects did not have this problem. Besides, of the four other subjects who experienced trouble with the voice distinction, two had passives with agentive by-phrase as target, and a third had actives with their usual 'unmarked' direct objects.

It must be concluded, then, that activeness and passiveness in sentences can be distinguished independently of the postverbal adjunct, and perhaps independently of subject nominal as well. The agent-object lexical pairs used in the stimulus sentences were non-reversible, such that the presence of a 'victim' nominal as subject always co-occurred with a passivized verb phrase, and could conceivably signal the presence of the latter; but since there was no systematic passive facilitation effect, it would appear that the inherent semantics of subject nominals exerted no influence in the experiment. It is more likely, as has been discussed above (p. 169), that the inference of subject nominals' role function depends more on the following verb phrase than on the implicit referential meanings of those nominals themselves.

More cogent to the present investigation are the patterns of TPV and PVA error, and their interactions with target TPV and voice attributes. One TPV X Voice combination in particular, it has been suggested, stood out from the rest as deviant in the pattern of yes-error means it occasioned: had it not been for the perfective active target groups, PAO and PAB, postverbal adjunction error might well have loomed as the only major source of false positive responses in the experiment, with TPV error a nonsignificant factor along with voice error and the rest (see Figure 1). It was only for these perfective-active subjects that the TPV distinction appeared to be a real problem, and since a TPV error for them involved mistaking a V+ed phrase for a has/have V+ed phrase, one is forced to conclude that these expressions must be highly synonymous to the average speaker, for they appear to be very different in form.

Voice error -- mistaking has/have V+ed phrases for has/have been V+ed -- were not a problem at all for the perfective-active subjects, suggesting that this formal difference is associated with a fairly obvious semantic difference. Combined TPV + Voice errors occasioned more confusion for these subjects than for most, but this can be explained by formal similarity, since for them this distinction involved telling has/have V+ed phrase from equally long was/were V+ed. The fact that tense was covaried with perfectiveness in this experiment no doubt contributed to this TPV + Voice error component. PVA error for the perfective-active subjects was no greater than their TPV + Voice error mean, but it was considerably less than that of all other subjects in the experiment. This effect is not easy to explain, for the problem of distinguishing direct-object nominals and non-agentive by-adverbials from agentive by-phrases and other prepositional adjuncts would seem as great for IAO and IAB subjects as for PAO and PAB, but such was not the case.

The PAO and PAB target groups were not as homogeneous in their concept-formation performance as the yes-error means would imply. Besides being restricted to the 'lower' half of the hierarchical cluster analysis (Table 3), these subjects' LET means (Table 2) show that they differed considerably in their rates of concept acquisition, if not in the order in which concept attributes were acquired. Both groups solved the TPV distinction last, at somewhere between 65 and 71 percent of the way through their trials; this was later than any other subject group, and agrees with the observed difference in yes-response means (Figure 1). The PAO subjects, however, resolved the PVA and Voice differences much earlier than did the PAB subjects -- between 26 and 29 percent of the way through their trials, on the average -- and spent the remaining 36 percent (up to 65 percent of the way through, at which point they made their last TPV error) figuring out that their target verb phrases were the ones with a have...-ed construction. The PAB subjects, by contrast, spent 54 percent of their trials making their first syntactosemantic distinction, i.e., that their target sentences were the non-passive ones ending with a non-agentive adverbial by-phrase; once they had made this distinction, the rest seemed to fall into place. This large discrepancy in PVA differentiation certainly suggests that active transitive declaratives with direct objects are somehow more 'natural' than those ending in a by-phrase, but it does not explain why the 'unnatural' construction was not adverted to first, rather than last, nor why subjects with imperfective active targets (IAO and IAB) made their voice and TPV distinctions less than 9 percent of the way into their experimental sessions, then spent about 40 percent of their trials in confusion about both direct objects and non-agentive by-phrases, respectively.

Since passiveness in sentences has been shown to be conceptually isolatable in the verb phrase, independently of agentive by-phrases and perhaps of 'victim' subjects as well, the first, preliminary goal of this investigation has been achieved. This finding provides some direct empirical support for the independence hypothesis, i.e., the notion that the major constituents of voice syntax have some independent communicative reality; some indirect support for the more general serial elaboration hypothesis can be inferred as well. A great many questions remain to be answered, however, not only with respect to the be - predication hypothesis, which has not yet been subjected to test, but also with respect to the experimental results obtained so far, and arising from them.

Many subjects in this and other experiments (e.g., Baker et al., 1973; Reid, 1974b), when asked afterwards to describe in their own words the target sentence type, referred to passiveness as 'past tense;' only a few seemed to know, or perhaps had ever really learned, the correct grammatical term. One suspects that there may be a grain of psychological truth in the way people seem to associate pastness with passive voice. Tense, on the other hand, has always been at least as much a purely formal grammatical entity as a semantic one referring to time of action; this was so even in traditional grammars, where the tense labels -- all borrowed from Latin -- really stood, in wholistic fashion, for the various _auxiliary_ + _main verb_ constructions. In modern English grammars, tense _is_ a purely formal distinction between alternative shapes -- usually labelled 'past' and 'non-past' -- of the first-occurring verbal element in a verb phrase. The perfective _have_ auxiliary is said to signal completed action, but subjects' concept-acquisition patterns and post-experimental reports in the present work suggest that simple past-tense main verbs may convey completeness of action, semantically, as much as do perfectivized verb phrases.

Two other areas of inquiry which were only partly elucidated by the first experiment in this study were the victim-event relation between passive subjects and verbs, and the exact relation of postverbal prepositional phrases to verbs and their complements. Although target voice interacted with perfective aspect to yield aberrant TPV and PVA error scores, the task of distinguishing non-target actives from target passives occasioned no greater difficulty for subjects than did the reverse; one cannot reject the possibility that the non-reversibility of the passive subject NPs was no help to experimental subjects in this regard, but, without evidence from both sides of the reversibility dimension, there are no grounds for any sort of positive inference, either. Postverbal phrases were a distinct problem, in Experiment 1, it seems clear, but with the _by_- vs. other-phrase alternation constituting in effect a different variable in passives than in actives, it is difficult to discern any clear pattern of response. A less complex situation might have yielded more transparent data.

Experiment 2

Introduction

Although it would be illuminating to explore the finer nuances of grammatical meaning detected by speakers in various _tense_ X _perfective_ X _passive_ expansions of the verb phrase, it would be somewhat beside the main thrust of this thesis, which is to find out whether ordinary speakers use passive locutions as if they were linearly constituted, or as if they were transformationally derived. In any study focusing on interactions within the verb phrase, _be_--_V+ed_ constructions would tend to be treated as part of the verb phrase, i.e., as an entity distinct from postverbal adjunction, when the _be_ -- PRED hypothesis claims that past participles _are_, in effect, postverbal complements. To provide substantive evidence for the transformationless view of voice outlined above, therefore, it would be necessary to show that the so-called passive be functions communicatively as a main verb, rather like that of be -- ADJ and be -- NP constructions.

In light of Svartvik's findings, one would not expect to find all occurrences of the passive -- agentful, as well as agentless and non-agentive -- equally like be -- ADJ constructions in their communicative impact; what seems more likely to be the case is a gradient of 'adjectivity' which is inversely related to Svartvik's 'activizability' continuum (see Chapter 3, above). A full test of the cognitive reality of Svartvik's passive scale would have to encompass all the apparent degrees of attributiveness, and seek to elicit finely differentiated speaker behavior with respect to each one. Such an investigation, however, would be somewhat premature at this point, for it has not yet been empirically determined whether passive locutions bear a syntactosemantic likeness to any other sentence type at all. The point of the present study is not so much how various NP--be--V+ed sentences are functionally related to each other, but rather how they, in general, are related to other forms of be predication.

A minimal test of the be -- PRED hypothesis would elicit graded differentiation judgments among NP -- be -- ADJ, NP -- be -- V+ed, and NP -- be -- NP sentences, the expectation being that the first two differ less from each other as 'manners of speaking' than from the third. A more informative experiment, however, in light of what is empirically known about active and passive locutions, would provide inferential links with previous findings on full and truncated passives, as well as a fuller exploration of Svartvik's passive scale. A five-way test was thus envisioned, with three subtypes of NP -- _be_ -- _V+ed_ predication to be distinguished from NP -- _be_ -- NP and NP -- _be_ -- ADJ sentences, and from each other. Agentful passives were not likely to be classed as attributive in intent; non-agentive 'statal' passives, however, at the opposite pole of Svartvik's adjectivity scale, seemed very likely to be so categorized. Agent-replaced agentives would provide the crucial test of the _be_ -- PRED hypothesis: as the central and most frequently-occurring type of _be_ -- _V+ed_ clause, and already the object of much empirical research, they could not be ignored, and their fairly unequivocal agentiveness, compared to Svartvik's Janus-agent and emotive-attitudinal types, embodied a simple, yet direct and rather strong claim about the attributive aspects of passive locution.

In order to provide the inter-type similarity data, a direct method of judgment elicitation was devised, in which subjects would be asked to sort out sentences according to their personal apperceptions of what are or are not, at some level of analysis, instances of the same manner of speaking. This procedure constituted, in effect, a simple yes-no judgment on each sentence's functional similarity to every other sentence in the array; presumably, only those sentences which were most like each other at a given level of analysis would be classed together, and the number of times each sentence was put together with every other sentence, over the entire subject sample, would yield a group similarity matrix for the sentence set (Miller, 1967, 1969). Hierarchical cluster analysis (HCA) (S. C. Johnson, 1967) would be applied to the matrix in order to reveal whether there was indeed hierarchical structure in the data, and whether the successively inclusive groupings, as empirically determined from the summed similarity judgments, could be related to any *a priori* notions of inter-item equivalence (see HCA of Experiment 1 subjects, above).

While the analysis of group matrices provides fairly direct evidence of the dominance relations among sentence-type attributes, as perceived by the average speaker, it provides little or no information concerning similarities or differences in sentence-feature perception among individual subjects, nor of the temporal order in which the various features come to the fore as (dis)similarity criteria. A method of successive sorts was needed, in order to preserve the relative relevance to individual observers of the various sentence type-distinguishing features perceived in the stimuli. Such a method had to permit subjects to make as many major distinctions as they considered relevant, at each juncture, but at the same time had to discourage the unconstrained proliferation of subtypes on the basis of marginal criteria.

Three successive binary divisions seemed to be minimal for eliciting a graded breakdown of the sentence set into the five a priori types -- if, indeed, speakers made the same distinctions as grammarians. Subjects could not, however, be limited to binary sorts; these were to be encouraged, as a means of capturing important dominance relations, but the way had to remain open for subjects to make three- or more-way subdivisions of a sentence group, in accordance with their own syntactosemantic perceptions. In order to obtain their best hierarchical intuitions in the matter, it was decided to instruct them to peruse the sentences initially with an eye to later classifying them into the most important types, then afterwards to ask them to effect a gross two-way split of the sentence set; if they protested that there were more than two major types in the set, they were to be allowed to make a three-way sort, and so on. Further subdivisions of the primary sentence types were to be elicited in the same fashion, as would those of the secondary groupings, in turn.

Stress was to be laid on the sentences' representing different kinds of statements, and subjects were to be instructed to disregard what was being talked about in each sentence, concentrating instead on the kind of thing that was being said about it. In all instances, it was to be emphasized that sentence groups need not be equal in size, nor need there ever be the same number of groups; sorting was to be governed at each step by subjects' own perceptions of what constitute differences in manner of speaking, and where they saw no such difference -- only after the first major split, hopefully -- no further subdivision needed to be made. At least one subsort could be expected from every subject at the tertiary level, though previous findings concerning the salience of such seemingly irrelevant features as subject number and animateness (Reid, forthcoming [b]) led one to expect more. Once an attempt had been made, at least, to subdivide each secondary grouping on the basis of overall locution type, the experimental task would be essentially complete.

With five basic sentence types being presented for differentiation, it promised to be interesting to find out whether two- or three-way sorts predominated at the primary level, on what bases the distinctions tended to be made -- i.e., whether active vs. passive, nominal vs. attributive, etc. -- and the degree to which participial complements were grouped with adjectival ones as being more or less attributive, as well. The most telling result, of course, would be that with respect to the agent-replaced passives. If these were judged similar to the other two classes of attributive, to any reliable extent, this would constitute support for the be -- PRED hypothesis, that the paradigmatically-related way in which passive constructions are apparently acquired in childhood (Bates, 1969; Watt,

1970) persists into maturity: it is not replaced, in everyday language-use competence, by any discernible transformationally-related construct, idea, or process, even though the systematic relations embodied in the passive transformation can be (though all too frequently are not) learned by precept, and added to what Watt called one's "archival" competence (1970, pp. 158ff.).

Method

Materials. In order to provide sentential materials to be sorted, the subject NPs of the Experiment 1 sentences (see Appendix A) were taken as the structural and lexical models for 24 basic subject NP types, each of which was developed into five different types of statement, as follows:

1. NP was/were (Det) N Prep NP.
2. NP was/were ADJ Prep NP.
3. NP was/were agentive V+ed by agent NP.
4. NP was/were agentive V+ed Prep non-agent NP.
5. NP was/were statal V+ed Prep non-agent NP.

Many of the IPB and IPO sentences of Experiment 1 were preserved largely intact, as instances of Types 3 and 4, respectively; half of these agentive V+ed participles were replaced, however, in order to keep the agentful and agentless passives as lexically distinct as possible, in the postcopular position. Postverbal NPs were kept simple, consisting for the most part of a determiner, a modifier, and a noun. Structural variation within the verb phrase was avoided, in order to keep the number of stimulus subclasses within reasonable bounds, and simple past tense was adhered to because of certain semantic anomalies which arise from the use of 'is,' 'are,' or 'has/have/had been' in front of participles and adjectives, respectively. Statal _V+ed_ predicates were selected in accordance with Svartvik's Class _epsilon_ criteria (1966, pp. 135-7; p. 97, above): they were distinguished from agentive predicates in that external agency seemed unlikely or impossible, in the context of each particular clause.

Except for function words, no two of the 120 sentences had the same basic lexical content, as far as subject nominal and postverbal adjunct were concerned. The uncorrelated counterbalancing among word count, grammatical number, and definiteness of determiner which existed in the Experiment 1 sentence subjects was, however, preserved, not only for the sake of variety, but also to provide additional bases for sentence sorting, beyond the type features under investigation. This step introduced additional variation into the experiment, but it was necessary because, with three successive sorts being solicited, provision had to be made for those subjects -- almost certain to be sampled, judging from previous experiments -- to whom structural differences are either opaque or irrelevant, and who might otherwise sort sentences largely (and uninterpretably) on the basis of idiosyncratic criteria. Extraneousness, in any case, is a matter of _a priori_ assumption, until demonstrated, and, unless one can observe the effects of a wide range of controlled independent variables, it is difficult to make meaningful inferences as to what is relevant to speakers and what is not.

The sentences were printed (and punched) on plain white computer cards, for ease of handling, duplication, and processing. As subjects effected their sentence sorts, the cards were to be hierarchically numbered by the experimenter, for later keypunching; each subject would thus have to be provided with an unused deck. A randomization of the sentences was devised, in which an exemplar of each of the five basic types occurred only once in every five successive cards, and all subject decks were arranged in that order for presentation. The complete list of the Experiment 2 sentences appears in Appendix C.

Subjects. Sixty persons, 30 male and 30 female, volunteered their services in response to an appeal in the classified advertisements of a Victoria, B.C. newspaper. No remuneration was offered or given for their services. All had native-speaker fluency in English, and most were monolingual. They ranged in age from 15 to 71, with a mean age of 39.7 years (S.D. = 15.9); their completed years of formal education ranged from 8 to 18, with a mean of 13.1 -- i.e., one year of post-secondary education, on the average (S.D. = 2.6).

Procedure. Subjects were seated comfortably at a cleared table, in most cases the kitchen or dining table in their own home. The experimenter sat opposite the subject or to the side, whichever was more convenient. Instructions were read from cards in as natural a manner as possible, with frequent stops to ensure that the subject understood what was wanted of him. Technical expressions were deliberately avoided, in order to make the instructions maximally comprehensible to subjects of all ages and education levels. The complete text of the Experiment 2 instructions is presented in Appendix D.

At first, subjects were asked simply to read each sentence quickly, being on the lookout for the different kinds of sentences there might be in the set, but making no effort to classify them. Next, an attempt was made to focus subjects' attention on the postverbal constituents of the sentences, for the sorting task to come: this was done by means of example sentences in which transitive verbs were followed by direct object or manner-adverbial adjuncts; these, it was pointed out, illustrated slightly different kinds of message or "thought pattern," quite aside from differences that were merely lexical. Subjects were repeatedly told to try to ignore what each sentence was about, and to concentrate rather on the kind of thing that was being said about the sentence subject, whatever it was.

Subjects were asked to begin the sorting task by dividing the entire set of sentences into two main groups, according to what they considered to be the two fundamental types of 'thought pattern' represented there. Then they were asked to divide these two main groups into two subgroups each, according to what now struck them as the principal thought-pattern difference within each group. At the third stage of sorting, subjects were asked to re-examine each of their (four) subgroups so far, and to further subdivide those in which they still perceived some basic thought-pattern difference. This done, subjects were asked, without necessarily re-examining any of the existing sentence groups, to effect a further split, if they remembered some group still incorporating an important thought-pattern difference.

At each sorting stage following the first, subjects were free to choose which subdecks of cards they would further subdivide, and in which order they would process them. While they worked, the experimenter numbered the remaining subdeck(s) in pencil, on the face of each card, adding one digit at each stage, in a hierarchical grouping scheme, as follows:

(a) Stage 1: 1; 2; (3).
(b) Stage 2: 11, 12, (13); 21, 22, (23); (31, 32, 33).
(c) Stage 3: 111, 112, (113); 121, 122, (123); etc.
(d) Stage 4: 1111, 1112, (1113); 1121, 1122, (1123); etc.

Not all the numerical possibilities were used, necessarily, since subjects were not obliged to subdivide any group or subgroup in which they could perceive no important thought-pattern difference. The three-way split option was, in fact, never used.

Subjects were told that, as they worked on a sentence group, they could arrange and re-arrange card piles as they pleased, as long as the two resulting subgroups represented what they considered to be the two main types of thought pattern, in that group. Only rarely did subjects ask if more than two subgroups were permitted, and they were then told that they were. In every such case, however, the subjects agreed afterwards that some of their subgroups were more alike in thought pattern than others; this decision preserved the hierarchy of similarity judgments, and it provided a ready basis for consolidation at the current sorting stage, as well as for further subdivision at the next. The one- to four-digit number of the subgroup to which each sentence was ultimately assigned was later keypunched into the sentence card, for subsequent data processing.

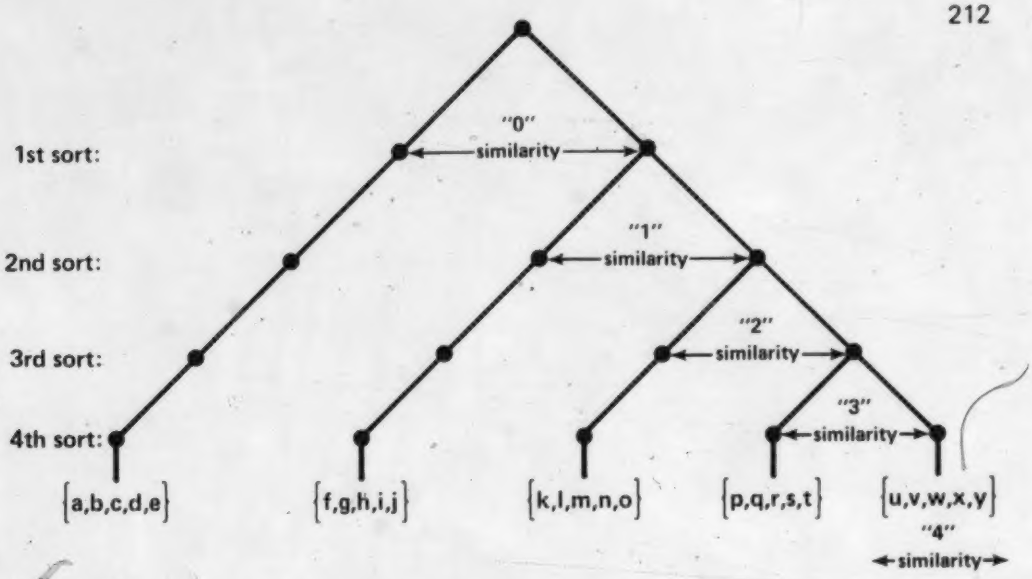
Scoring. Before the 60 subjects' similarity and difference judgments among the 120 sentences could be subjected to hierarchical cluster analysis, to determine what the relevant sentence attributes were, on the whole, and how these were inter-related, those judgments had to be assigned numerical values and summed over all subjects for each possible sentence pairing, and then summarized as a half matrix of (hopefully) differentiated integers. The HCA would subsequently show whether the numbers thus obtained were in fact differentiated in any systematic way, and examination of the particular sentences within successively more inclusive clusterings would suggest inferences as to the relative salience, to experimental subjects, of those sentences' apparent distinguishing features.

Obviously, one cannot quantify people's simple 'same' vs. 'different' judgments _a posteriori_ without making certain assumptions, which may or may not be warranted. To begin with, no subject was ever asked to express a judgment on a particular pair of sentences in the stimulus array; each (_x_, _y_) entry in the similarity matrix represented, in effect, the total number of subjects who put sentences _x_ and _y_ together in the same group at some stage in the sorting procedure, or alternately, who did not, for some reason, dissociate them into different groups. Each matrix value was thus an _inferred_ sum, to whose magnitude each subject had unwittingly contributed, simply, either a positive numerical quantity or zero. The general similarity matrix, furthermore, was a conglomeration of 7140 such inferred sums, and hence represented only the combined judgments of all 60 subjects taken as a group, since the contributions of individuals tend to become submerged, in the matrix derivation process.

Making inferences from the summed judgments of a heterogeneous subject group can be a problem, of course, because there is never any assurance that a randomly-selected sample of subjects reliably represents the population to which inferences are to be drawn. But to the extent that subject selection methods are unbiased, and providing that the sample is sufficiently large, one can have reasonable confidence in the validity of one's conclusions, at least until replication either confirms or denies them. This, however, is one of the persistent problems of inductive inference in general, and cannot be resolved here. What is of greater importance to the present work is how one may best and most justifiably quantify, after the fact, subjects' putting together -- or failure to place apart -- items from an apparently heterogeneous collection which is of experimental interest.

Since the hierarchical clustering process itself depends only on knowing the rank order of all matrix elements with respect to each other, it suffices that, for every pair of items in the stimulus array judged 'not different' by more people than some other pair, that the number assigned to the 'more alike' pair be greater than that assigned to the less alike pair. A non-arbitrary solution, however, requires that all matrix entries be distinct: the presence of large numbers of equally-alike item pairs tends to produce ambiguous hierarchical clusterings, particularly with the 'maximum distance' method (S. Johnson, 1967, pp. 248-9). The degree to which this constraint is violated -- and it is almost certain to be, with a large array of non-randomly selected stimulus objects -- will thus be reflected in the interpretability of the HCA solutions: the less hierarchical structure the stimulus-object features are judged to have, in the eyes of experimental subjects, the less clearcut those solutions will be, and the greater will be the topological differences between solutions obtained through the 'minimum' and 'maximum' methods (ibid., p. 252). Hierarchical clustering schemes, in other words, cannot impose coherent structure on data where there is none; they tend, rather, to reflect the hierarchical structure -- or the lack thereof -- that exists in the data.

Since every subject either left a given pair of sentences together in the same group or placed them into different groups, at some point, it can be inferred that he considered them, for reasons of his own, to be more 'different' than 'non-different,' or vice versa. A simple, additive 1 or 0 from each subject for each such occurrence with respect to each sentence pair thus seems entirely justified; with no basis for differentiating among individual 'judgments' of this sort, it appears best to treat them all equally, and to trust that the rank-order relationships thus created will -- given enough experimental subjects -- approximate the similarity/difference judgments obtainable from members of the general population on an individual basis. The degree to which the ultrametric inequality would be satisfied in the data is not, for any a priori reason, likely to vary significantly from the one method to the other, and is, in any case, reflected in the topological congruence between 'minimum' and 'maximum' HCA solutions (see S. Johnson, 1967, pp. 246-252, and below).


1st sort:
2nd sort:
3rd sort:
4th sort:
"0"
similarity
"1"
similarity
"2"
similarity
"3"
similarity
{a,b,c,d,e}
{f,g,h,i,j}
{k,l,m,n,o}
{p,q,r,s,t}
{u,v,w,x,y}
"4"
similarity

a																									
b	4																								
c	4	4																							
d	4	4	4																						
e	4	4	4	4																					
f	0	0	0	0	0																				
g	0	0	0	0	0	4																			
h	0	0	0	0	0	4	4																		
i	0	0	0	0	0	4	4	4																	
j	0	0	0	0	0	4	4	4	4																
k	0	0	0	0	0	1	1	1	1	1															
l	0	0	0	0	0	1	1	1	1	1	4														
m	0	0	0	0	0	1	1	1	1	1	4	4													
n	0	0	0	0	0	1	1	1	1	1	4	4	4												
o	0	0	0	0	0	1	1	1	1	1	4	4	4	4											
p	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2										
q	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	4									
r	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	4	4								
s	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	4	4	4							
t	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	4	4	4	4						
u	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3					
v	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4				
w	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	4			
x	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	4	4		
y	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	4	4	4	
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y

Figure 2. Hypothetical hierarchical sort of 25 objects, and the associated similarity matrix, illustrating the primary scoring method applied to Experiment 2 sentence sorts.

The method of scoring applied to the Experiment 2 sentence sorts, therefore, consisted in incrementing the value of a matrix cell (_x_, _y_) by 1, each time a subject failed, in four successive (re-)sorts of the entire stimulus array, to dissociate sentences _x_ and _y_ into different (sub)groups. The effect was cumulative and hierarchical (see Figure 2): sentences separated in the first sort ({a - e} vs. all others, in the illustrative example) were rated 0 for similarity with respect to each other, between groups; sentence pairs within these major groups, however, received positive integer values, in accordance with their degree of non-separation. All pairs within a final subgroup (such as {a - e}, {f - j}, etc., in the Fig. 2 example) were rated 4, for each subject, since these had been left together through four possible stages of sorting. Between-group pairs were similarly rated, in accordance with the number of sorting stages through which they had been left together: members of subgroups such as {p - t} and {u - y}, therefore, were rated 3 in similarity with respect to each other within the subgroup, but only 2, as members of a more inclusive third-stage group, with respect to members of subgroups such as {k - o}.

The primary similarity matrix for every subject in Experiment 2 thus had values in it ranging from 0 to 4; Figure 2 shows, in addition to the hypothetical object sort referred to above, the matrix derivable from it, using the scoring method just described. The 60 subject matrices of

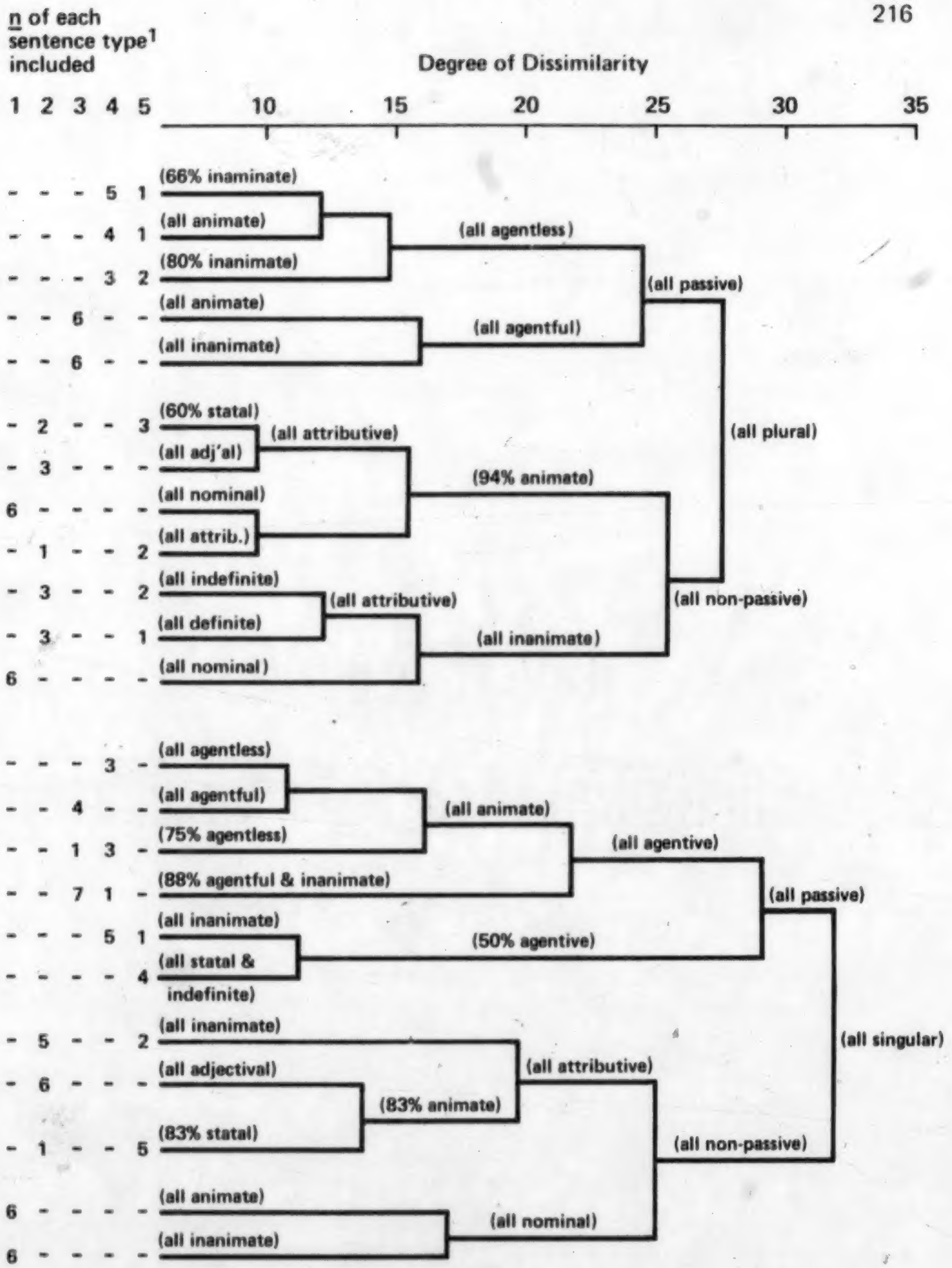
Experiment 2 were simply added, cell-wise, in order to obtain the group similarity matrix. Diagonal values, representing each sentence's presumably perfect similarity to itself, were ignored, for purposes of the HCA.

Results

The S. Johnson (1967) HCA computer program applies two slightly different computational methods -- the 'minimum' and the 'maximum' -- to yield clustering solutions which are "optimally 'connected'" and "optimally 'compact,'" respectively. To the extent that the ultrametric inequality condition obtains in the data -- i.e., to the extent that no two stimulus objects are rated more like each other than either is like some third object (a somewhat unlikely event, in the realm of behavioral research) -- the two clustering procedures reduce to a single 'minimum distance' method, and the two solutions thus obtained become topologically congruent. Thus, while "the precise numerical values associated with the clusterings [might] differ somewhat between the two methods," the fact that, at the upper clustering levels, at least, "the same subclusters appear in both representations and . . . that each such subcluster divides into exactly the same sub-subclusters . . . suggests that [the] data do not seriously violate the assumed ultrametric structure" (*ibid*., p. 252).

Unfortunately, no metric has been devised, whereby one can assess the exactness of fit between two subclustering patterns. The situation described above can result only from a similarity (or distance) matrix where all non-zero entries are distinct, or very nearly so; the greater the number of objects classified, the less likely it is that such well-differentiated data will result, particularly if, as in the present case, stimulus objects are deliberately designed to have high intra-group similarity on _a priori_ grounds. Highly congruent solutions would seem to be the exception, rather than the rule, and agreement between them at the higher inclusion levels is probably the best that can be realistically hoped for. The results of the maximum method have, in any case, been found to be generally the more meaningful or interpretable: "to the extent that there is an appreciable departure between the [hierarchical clustering solutions] . . . the search for compact clusters (of small over-all 'diameter') has proved more useful than the search for internally 'connected' but potentially long chain-like clusters" (_ibid_.). Every two objects in a given stimulus array, in other words, can be associated with each other in some way, either within or across hierarchical relationships; to the extent that the derived hierarchical clusterings appear cohesive, and not seriously obscured by inevitable cross-cluster similarities, however, one can, with due caution, assign significance to certain common features of object clusters, and infer dominance relationships among them.

A summary of the Johnson maximum or 'diameter' method



---

[1] be + nominal, adjectival, agentful V+ed, agentless V+ed, or statal V+ed, respectively.

Figure 3. Summary of Johnson 'diameter' method hierarchical cluster analysis of Experiment 2 data, showing the distinguishing features of successively inclusive sentence groups.

clustering of the Experiment 2 data appears in Figure 3; the complete HCA solution for this method is shown in Appendix E. It is immediately apparent that the most widely chosen bases for distinguishing among sentences were formal and semantic features having to do with sentence subjects, for these criteria figure prominently in the hierarchy at almost every level. Of these, the single most dominant distinction was subject singularity vs. plurality: the fact that HCA divides the entire sentence set exactly in half on that basis clearly indicates that it was regarded by informants in the experiment as a more important sentence type-differentiating factor than any other structural or semantic characteristic. Also prominent, but to varying degrees, were subject animateness and definiteness: the former unequivocally characterized the two main subclusters of the plural non-passives, the agentful plural passives, the singular non-passives with nominal complements, and, to a great extent, the singular non-passive attributives, as well. Definiteness of subject noun determiner was operative at the lower levels of clustering, mainly, serving to distinguish among plural non-passive attributives with inanimate subjects, in particular.

The finding of interest, as far as this thesis is concerned, is of course that the agentive passives (Types 3 and 4) were clearly kept apart from the non-passives (Types 1 and 2), once sentences had been primarily distinguished on the basis of subject singularity/plurality. Agentful plural agentives were clearly separated from agentless, by many informants, but this feature seemed to have somewhat less import among the singular agentive passives. Type 5 sentences (with statal and attitudinal V+ed complements), however, were classed as either passive or non-passive, apparently in accordance with whether the state or attitude denoted could be construed as involving some sort of voluntary activity, on the part of either the subject or some imagined agent, with the result that 'were entangled,' 'was involved,' and the like were considered passive, but 'were renowned,' 'was accustomed,' and such were not. The phenomenon was not absolutely clearcut, however, and probably subject to a great deal of variation among individuals, as witness 'were opposed,' which was generally considered passive, and 'was endowed,' which was not. Those statal-attitudinal predicates which were regarded as non-passive were not to any extent grouped with be -- NP sentences, but were treated for the most part as much like the adjectival complements of Type 2 sentences; hence, the superordinate category label 'attributive.'

As to the minimum or 'connectedness' method analysis of the Experiment 2 data (shown in Appendix F), there is no doubt that, compared to the 'diameter' solution, it embodied internally connected but potentially long chain-like clusters (S. Johnson, 1967; see above). The degree to which this clustering diverges from the one just described, however, is not as great as may initially seem, for the two primary sentence-type distinctions are the same, in both cases, and the lowest-level groupings have much the same -- in some cases, exactly the same -- membership. This is particularly evident in the non-passives, where the singular animate and inanimate nominals and adjectivals, as well as the plural animate nominals, remain as tightly clustered in the connectedness solution as in the diameter solution, despite the less clear hierarchical structure of the former, and the many inter-cluster connections evident in it.

The nominal/attributive and agentful/agentless distinctions are as much in evidence in the connectedness solution as in the other, though they serve to distinguish somewhat less congruent subclusters; as before, the animate/inanimate difference looms high in the hierarchy, second only to passive/non-passive as a basis for distinguishing sentences, with particular agreement among the plural non-passives of the two analyses. The statal-attitudinal predications (Type 5) are an especially interesting case, in that, while the majority clustered with passives or non-passives, as in the diameter solution, several -- some of them interpretable as activity-connected -- seemed to fall into the ill-defined areas between the major non-passive clusters (see Appendix F). The connections among these are, as one would expect, as much inter-cluster as hierarchical; some phenomena, evidently, are better represented by a chain-like connectedness analysis than by a compact diameter solution (see above).

Table 4.
Use of Various Sentence-sorting Criteria
at Four Possible Stages of Sorting
by 60 Subjects, Experiment 2.

Sorting Stage	Subj. NP length	Subj. NP ±DEF.	Subj. NP ±PLUR.	Subj. NP ±ANIM.	Pred. ±AGNTV/ PASSIVE	Pred. ±NOUN COMPL.	Other
1st	--	--	13	3	15	6	22
2nd	2	2	2	7	21	11	36
3rd	5	7	10	7	15	3	36
4th	2	--	--	--	6	2	8

Table 4 shows the extent to which various sorting criteria were used by the 60 subjects at each of the four stages of the experiment. These frequencies are only approximate, having been gleaned more from individual subjects' actual sentence groupings than from their introspective reports thereon, which tended to be highly idiosyncratic and imprecise, and often at variance with contemporary grammatical practice. Criteria tended to be applied inconsistently, and at different stages within the same sentence sort, furthermore, with the result that there is a certain amount of overlap between cells in the table; the counts, therefore, represent only the relative number of times a given criterion was apparently applied, by some subject, at some sorting stage in the experiment. The 'Other' category includes such subjective criteria as: fact vs. opinion; pleasant vs. unpleasant; familiar vs.

unfamiliar; and related vs. unrelated to politics, science, aesthetics, the performing arts, etc., not to mention the formal and semantic features of postverbal noun phrases, and a host of ill-defined intuitive reasons subjects could think of, for placing a sentence in one pile rather than in another.

The figures, such as they are, seem to contradict, in part, some of the observations made above. For example, the relative frequency with which number in the subject nominal was applied as a sorting criterion appears to be less than the consideration given to passive/non-passive; this would suggest that the overall dominant distinction among be predications, as far as most speakers are concerned, is the latter, not the former. Such may indeed be the case, but it must be remembered that whereas the singular/plural distinction is simple, unequivocal, and straightforward, the assignment of sentences to either the agentive passive or the non-agentive, non-passive category in Experiment 2 was subject to a great deal of individual interpretation and beset with uncertainty; unlike nominal/attributive and the formal distinctions, passive and non-passive were apparently not clearcut, mutually exclusive categories, in this experiment, irrespective of the presence of Type 5 sentences. The passive/non-passive difference, furthermore, generally coinciding with agentive/non-agentive, could be applied more than once within the same hierarchy: sentence groups containing Types 3, 4, and 5 -- hence characterized as predominantly agentive passive -- for example, were frequently subdivided into relatively more and relatively less agentive subgroups, depending on the explicitness or inferrability of agency. What the HCA presented in Figure 3 represents, therefore, is the clarity and consistency with which the various criteria were applied to the sentences, as much as frequency per se; the passive/non-passive distinction suffers somewhat on this score, due to its apparent fluidity, and comes out second. And this, in a way, is what Experiment 2 was designed to demonstrate: that be -- V+ed predications lie on a continuum which may be dichotomized differently by every speaker of the language. The widespread use of 'Other' classification criteria by subjects shows up in the last column of Table 4; it is also reflected in the divergence between the two HCA solutions, and will not be commented on further here.

Discussion

It was something of a disappointment that the subjects in this experiment did not, in general, consider agentive passives -- even agentless ones -- to be anything like adjectival complement sentences. The only construction grouped together with the latter with any consistency, in both HCA solutions, were those statal or attitudinal 'passives' which are not usually construed as denoting the result of some activity or event upon the sentence subject, namely, 'was situated,' 'was biased,' 'was suited,' 'were tired,' 'were renowned,' 'were addicted,' and so on. And yet, the presence of such as 'was endowed,' 'were frayed,' and 'were doomed' among the non-passives, as well as 'was headed,' 'was involved,' and 'were opposed' among the supposed passives leads one to question whether there is such a thing as a purely statal, emotive, or attitudinal be -- V+ed construction. The subjects' ambivalence towards them, not to mention the difficulty of devising a set of unequivocally 'static' statal predicates, emphasizes the seemingly inescapable intimation of activity associated with verbs, and again, the essential role played by context, in the interpretation of sentences.

Rather than a scale of 'adjectivity' among past participles, running inverse to some gradient of activizability, there would seem to be a fairly solid chain of dynamic 'prior event' associations, contaminated only at one extreme, as it were, with intrusions of static, qualitative meaning, and even then depending on the discourse context and different individuals' interpretation of it. The point at which Svartvik's multivariate continuum (see Chapter 3, above) shades from 'more verbal' to 'more adjectival,' in other words, is 'lower' than was previously thought, and Watt's unquantified formal characterization of participles as [+PRED, +VB, +ADJ] entities would seem not to correspond accurately to speakers' intuitions, except in a minority of cases. Langendoen's imputation of quasi-adjectival statality to agentless passives (1969, p. 119) would also seem to be denied by the empirical facts. It is almost as if adjectives were understood to convey only the intrinsic qualities of persons, places, and things, and participles, their extrinsically conferred attributes, the primary semantic connection remaining almost exclusively with some explicit or imagined agency, rather than with the recipient.

This finding is, however, not necessarily a vindication of the passive transformation. Despite the fact that speakers appear to infer, from superficial be -- V+ed predications, precisely that semantic infrastructure which has been said for generations to underlie them, it must not be overlooked that the informants in this experiment were as concerned with the definiteness, number, and animateness of sentence topics as they were with what was being predicated of them. They did so, furthermore, in spite of having been repeatedly admonished to sort the sentences out on the basis of the kind of thought that was being expressed, rather than in terms of who or what was being talked about. Therefore, the hypothesis that be -- NP, be -- ADJ, and be -- V+ed predications are essentially not different kinds of things to say about a given subject, is not unequivocally denied by the results of this experiment: the subjects' execution of a clear and precise instruction in this case leaves no alternative but to conclude -- as counteranalytic as it may seem -- that to talk about a number of subject entities in a sentence is a different kind of thing to say than to talk about a single entity, and that this difference is a more salient one than is the difference among saying what intrinsic or extrinsic property a given entity has, or what other entity it may be identified with.

There is always the possibility, of course, that what the informants were doing, in giving precopular variation priority over postcopular, was behaving, quite predictably, in accordance with the primacy effect principle so prevalent in memory and learning research. The small body of 'thematic prominence' experiments discussed above (pp. 139ff.) would seem to bear this proposal out, but they also lead one to wonder why the focus of attention in sentences, despite language users' overlearned linguistic habits, can apparently be manipulated through such subtle variables as noun imagery value (James, 1972) and discourse context associability (Prentice, 1966), but not through simple, direct, and explicit instruction. As for the victim-event relationship between subject and verb, it now appears more than ever to be a sine qua non of passive locutions; but the inordinate attention given by informants to the inherent formal and semantic aspects of subject nominals can hardly have had role-function elucidation as its purpose, for this task would seem to require the language user to look beyond the subject NP itself.

Whatever the reason for the importance attached to subject NP features as sentence-differentiating criteria, they must not be dismissed in this case as mere 'nuisance' variables. If they had not been systematically incorporated into the stimuli, in order to provide sorting bases for those individuals to whom other, more esoteric distinctions were either no longer available, or not apparent, or perhaps even irrelevant, the 'subject effect' would not have come to the fore, vying for eminence with passive/non-passive as a means of distinguishing among formally similar be -- PRED constructions. The assignment of the five original sentence types to their ultimate cognitive categories seemed little perturbed by the subject effect, in any case, for the results of HCA (Figure 3) were clearcut enough to be unambiguously interpretable; more damage was done to the clustering hierarchies by subjects' frequent use of 'Other' sorting criteria (Table 4), probably, than by the 'misplaced' application of straightforward formal and semantic notions.

Earlier speculations (above) concerning informants' association of activity -- even subject-initiated activity -- with participial forms suggests interesting possibilities for a further experiment. Where Experiment 2 provided opportunities for classifying be -- V+ed sentences only as 'static,' by placing them together with be -- NP or be -- ADJ sentences, or as 'non-static' by placing them apart, a follow-up study could, through the incorporation of be -- V+ing as a stimulus variable (see Watt, 1970), offer a three-way choice: static, dynamic, or neither. Although the results of Experiment 2 do not disconfirm the notion that passiveness is not a totally dichotomous variable -- given a set of mainly yes/no options, subjects had little alternative but to dichotomize -- a wider variety of gross typological categories might permit the Svartvik continuum concept to emerge more clearly. Again, it is because Experiment 2 was designed and conducted as it was, that this suggestion is possible, for the cognitive strength of the more abstract locution-type feature hierarchies _vis à vis_ simple, direct (and dichotomous!) sentence-subject features was not known before, on the basis of replicable empirical evidence.

In the absence of multidimensional variation within subject noun phrases, informants would be forced to pay more attention to postcopular occurrences, in order to make their sentence sorts. It is there that the strength of association between the various _be_ -- _V+ed_ types and static _be_ -- ADJ predications, on the one hand, or dynamic _be_ -- _V+ing_ assertions, on the other (_be_ -- NP sentences being ignored, in this case), should be seen to emerge. To the extent that agentive _be_ -- _V+ed_ constructions are perceived as implying some sort of activity, they should be treated, in an obligatory two-way first sort, as more like unequivocally active _be_ -- _V+ing_ sentences than like apparently inactive _be_ -- ADJ predications. Differences between activity which is 'centripetal' with respect to the sentence subject, as opposed to that which is 'centrifugal,' would presumably emerge in later subsorts. _Presumably_ so, because there is no guarantee that naive informants will see locution types as they are expected to in this instance any more than they did in Experiment 2, especially when deprived of the more obvious forms of variation in sentences, such as they had in the latter study.

The great dilemma with respect to the present experiment is that forms of systematic variation peripheral to the inquiry had to be introduced, lest uninterpretable results be the outcome, for the sorting procedure was a novel one, not having been attempted before with such a large number of full sentences (see Miller, 1969; Healy & Miller, 1970). And although subject awareness, on the whole, of locution type differences among be predications appeared to emerge fairly strongly, there is no way of assessing the extent to which the presence of marginal variables biased the outcome, nor is there any way of estimating what would have happened without them. With their apparent propensity to avoid structural analysis and rely instead on purely subjective criteria, subjects deprived of easy, obvious formal differences might well have produced incomprehensible data; but even that, in a negative way, would have been informative, since it could have been interpreted as evidence of no differentiation among be predications at all.

It cannot be claimed, on the basis of the Experiment 2 results, that the passive be functions much in the same fashion, communicatively, as the predicative be. Nor can it be said that past participles are, in effect, postverbal complements, at least not in the sense that nominals and adjectives are postverbal complements. Many individual subjects in the experiment could not, in fact, distinguish among *be* predications on the basis of postcopular differences, but the remaining informants more than compensated for this inadequacy: the general consensus was that to *be* (or get) *V+ed* does not embody quite the same kind of subject-predicate relation as to *be* (identified with) NP, or to *be* (qualified as) ADJ, and the dissociability among the three kinds of predication was such as could not be obscured by subjects' devoting a considerable amount of attention to marginal and even irrelevant criteria.

No significant evidence in favor of the paradigmatic view of passives (pp. 164ff., above) can be presented as a result of Experiment 2, either. It appears that while the unitary *be* -- PRED hypothesis may well describe young language learners' conceptualization of these manners of speaking, the adult inclination is to treat *be* -- NP, *be* -- ADJ, and *be* -- *V+ed* predications as different in kind. At some point during the maturation process, apparently, the speaker learns, through use, to make different kinds of subject-predicate association with highly similar but not identical construction types; in other words, linguistic structures which at first appear superficially to be the same sort of thing are gradually differentiated.

One might say, as many indeed have, in the light of similar empirical evidence (e.g., Beilin, 1975), that language learners, some time after the age of five, acquire the passive transformation. But this is putting it simplistically: what language learners learn, as extensive portions of Chapter Two, above, have attempted to show, is something which a number of abstract derivational rules purport to describe, not on the basis of how speakers of the language use supposedly different kinds of messages, but by codifying the structural and semantic correspondences perceived by grammarians among certain well-formed utterances of adult language. These perceived relations are generally framed as symbol-manipulating operations in descriptive automata from which all redundancy has been eliminated; given the circumstances under which, and the purposes for which, generative-transformational grammars are formulated, any correspondence between what language learners learn and what such rules actually describe would thus seem to be largely fortuitous. No matter how compelling the logic, it is through empirical investigation, not grammars, that empirical questions will ultimately be resolved, and the failure of one experiment to turn up evidence for a non-transformational characterization of competence hardly constitutes _de facto_ support for the transformational version. The _be_ -- PRED hypothesis may not have received unequivocal support from Experiment 2, but neither it nor the concept of 'left-to-right' processing has thereby been unequivocally denied; further experiments based on these findings may yet vindicate the notion.

CHAPTER FIVE

GENERAL DISCUSSION AND SUMMARY

On the Empirical Status of Grammatical Voice

It was not expected, at the outset of the present work, that an Endlösung to the voice problem would be arrived at; to have found what has eluded both philosophers and scientists for over twenty centuries would have been gratifying, but hardly realistic as an immediate research goal. What was hoped for, rather, was to clarify, if only a little, what activeness and passiveness consist of, to speakers of English, and, more importantly, to do so, not on the basis of further philosophical speculation, but on grounds of replicable empirical evidence gathered from unsophisticated speakers of the language. This more modest goal, it may be safely asserted, has been reached.

The view of active and passive sentences that has been arrived at here has been succinctly stated -- though largely on the basis of intuition -- by Langacker & Munro (1975, p. 821): whereas active sentences are about something that a logical subject or agent does, passive sentences are about something that happened to a logical object; an active construction, furthermore, highlights the doer, but a passive one focuses on the being. Empirical evidence to support these assertions comes first of all from the results of Experiment 2, in the present study: the fact that speakers tended, by and large, to separate agentive passive sentences quite clearly from non-passives suggests that the main criterion among _be_ predications is whether or not activity of some sort can be inferred, for the main characteristic common to nominal and adjectival complements, vs. agentive passives, is the non-occurrence of a transitive _V+ed_ form. This was further confirmed by a tendency for statal _be_ -- _V+ed_ constructions with remote activity or event associations to be grouped with the agentive passives. Thus, while active sentences can be said without much fear of contradiction to deal predominantly with animate agents -- or inanimate subjects, through personification (Clark & Begun, 1971) -- _doing_ things, the one notion uniting passives would seem to be some logical object, mainly inanimate (Svartvik, 1966), having 'suffered,' undergone, or somehow been affected by, some event, whether caused or not.

All of the sentence types investigated in Experiment 2 had to do with being, in one way or another. The fact that the sentences were distinguished more clearly and more consistently on the basis of subject NP plurality than on the basis of the different sorts of _be_ predication, however -- despite the numerical predominance of the latter, as sorting criteria -- justified the initial hypothesis of the experiment: _be_ -- _V+ed_ sentences must ultimately be seen, upon critical examination, as formally and semantically different from be -- ADJ and be -- NP sentences, but this difference is not one that is immediately obvious. Up to a point, passive statements are perceived as X -- be -- Y locutions, much like the others.

The fact that differences within the subject NP attracted as much attention as they did would seem to contradict the contention that it is the being which is in focus in passive sentences. Certainly, one would expect passive subjects to be somewhat less noticeable that those of active sentences; there is plenty of evidence that passive subjects normally tend to be inanimate, infrequently-occurring abstract nouns of low imagery value (Clark & Begun, 1971; James, 1972; Paivio, 1969; Svartvik, 1966; Taylor, 1969). One can therefore only speculate that the 'subject effect' observed in Experiment 2 must have been, in part at least, unavoidable experimental artifact: the deliberate three-way dichotomous variation of sentence subjects in terms of number, definiteness, and animateness must have been noticeable, after initial perusal, as a rather unnatural assortment of sentence topics for be predication sentences.

The main contribution of Experiment 1 of the present study is to provide a more solid empirical footing for a number of beliefs that have stood for years on intuition alone. Beyond the interesting but subsidiary finding that simple past and present perfect verb phrases appear to have the same meaning, despite very different form (pp. 184, 192-3, above), it was found that the voice difference appears to be most significant in the verb phrase, and rather less so in both the preverbal 'victim' subject and postverbal adjunct. This finding justifies Svartvik's general contention that the voice phenomenon resides principally in the verb, in English, and also his speculations concerning the multivariate nature of the passive scale. It is also in accord with the implications of a number of grammar proposals since Hasegawa (1968) and Chomsky (1970), concerning the non-unitary nature of the active-passive relation. Being motivated more by the pursuit of descriptive economy than by any sense of responsibility toward empirical facts, however, these grammars fall considerably short of psycholinguistic relevance (see below). The voice-in-verb finding, furthermore, partly explains the failure of Experiment 2 to reveal passive _be_ as a main verb and _V+ed_ as a postverbal complement, and it argues for continued description of passive predicates as an optional aspectual component in verb phrases, with some postverbal ramifications.

The relative independence of postverbal adjuncts in Experiment 1 reflects their tendency not to occur, in discourse. Since agentless passives account for 85 percent of _be_ -- _V+ed_ clauses in written English (Svartvik, 1966), it is not at all surprising that the alternation of agentive _by_-phrases with non-agentive ones and with other kinds of constituents should be regarded as a somewhat secondary phenomenon, in sentences, compared to the major role played by subject and verb phrase in conveying sentential meaning. It is something of a mystery, therefore, why passive sentences should continue to be accounted for in grammars as alternative realizations -- whether paraphrastic or not -- of some intended meaning structure including a subject, an event, and, in the vast majority of cases, some ghostly causative agency which never achieves expression in speech. Ideally, passive sentences should be described quite independently of active transitive clauses, as much as now are active intransitive clauses, be -- Complement clauses, and all the rest; these are all inter-related in some way, as Experiments 1 and 2 have shown, and while the historic correspondences among sentences with two-place predicates seem to demand acknowledgment, empirical evidence increasingly insists that their recognition be commensurate with their rarity of occurrence. Passive sentences, in other words, ought to be conceived of in grammars primarily as the externalization of some subject's being affected by some event, with the temporal aspect in most cases rather unspecific, and with causation relegated almost to the status of an afterthought.

Grammars, unfortunately, are incapable in principle of accounting for that uniquely human faculty of being able to 'make it up' as one goes along, in speaking, and, to a certain extent, in interpreting what someone else is saying; they can only attempt to describe all of the structure and meaning implicit in each sentence as a fait accompli, without regard to the mind-boggling complexities of ideational sequence. Some grammarians, however, have in recent years perceived the relative independence of active and passive sentences, and have been attempting to account, in one way or another, for it, and for other apparent facts of language-use behavior. Within most theories of grammar, this means primarily doing away with the passive transformation as a sine qua non of sentence description, and a few steps have been taken in that direction, as well. The inevitable corollary, that if the passive transformation is non-essential to sentence generation, so are they all, has been mentioned by the occasional theorist, but has been a basic feature of only one concrete proposal so far. These recent developments in sentence-description theory will now be reviewed.

On the Superfluity of the Passive Transformation

If the denial of the passive transformation seems to have been given some prominence in this thesis, it is because that rule has been accorded such widespread and unquestioning acclaim, in linguistics. Based, no doubt, on the long and influential tradition of subject-object inversion in grammatical descriptions, general acceptance of the passive and other transformations was doubly assured by the apparent convenience, simplicity, and generality they afforded grammars, as means of enumerating all possible sentences of a language. And, although they have been inveighed against on grounds of their 'cryptanalytical formalism' (Reichling, 1961), their entanglement in deductive circularity (Stuart, 1969), and their dependence on user-conferred teleology (Prideaux, 1971) -- not to mention the apparent impossibility of obtaining consistent experimental results either for or against them -- they remain, like their proponents, virtually unmoved (Botha, 1973). The only effective arguments against them, as formal descriptive devices, would therefore seem to have to demonstrate inadequacy on their part in the very formal descriptive task they were designed to carry out, i.e., to make it possible for a grammar to generate 'all and only the grammatical sentences of L.' Such argument is relatively scarce, but it has been occurring with increasing frequency in the literature, of late, and not only on grounds that a given alternation does not exist in some language (e.g., Moyne, 1974; Moss, 1972), but also to claim that a recognized inter-type relation can be better accounted for in some other way. The more recent proposals deserve attention here, particularly those dealing with the active-passive voice relation.

Robson (1972) found the passive transformation, in all of its formulations, deficient on a number of counts. His most convincing arguments focused on the perennial conundra that passives do not always paraphrase some active, especially if quantifiers, negation, or modals are involved, and that certain nominals (e.g., pronouns) cannot occur with equal acceptability both preverbally as subject of an active sentence, and postverbally as agent of a passive. Passives, furthermore, do not exist, as we know them, in many languages, or occur only without expressed agents. On these grounds, Robson concluded that the passive transformation is altogether superfluous, and that the adaptability of other independently-motivated T-rules to the task made it possible -- even necessary -- to reduce the universal inventory of available transformations by one. By permitting verbs to bear the syntactic feature [±A(ctive)], in addition to the familiar [±V] and [±ADJ] (pp. 99ff.), Robson's 'PASSIVE-less' grammar (PLG) was able to represent, in one deep structure, both the surface constituent order and the semantic structure of an active or a passive sentence. Generalized rules of be and preposition insertion, patterned after Bach (1967) and Postal (1971), eliminated the problems of derived constituent structure in AUX complexes and the ad hoc manipulation of manner adverbial nodes; at the same time, the PLG treated be as a true lexical verb --recalling a proposal by Lees (1964) -- and by as a redundantly specifiable element governed by agentive case (pp. 62f., 66f., 103ff., 106ff.).

Not surprisingly, Robson mentioned no connection between any feature of his PLG and the knowledge of acceptable sentence structure which mature speakers presumably have; it was a purely formalistic grammar, in the sense of Steinberg

(1975). It is interesting to note, however -- though this radical departure from tradition was never fully explained -- that considerable value was attached to the generation of sentence constituents in their observed superficial order, and that passive participles -- formally undistinguished from perfectives, in the PLG -- were treated more like postverbal complements, as in Bach (1967), Watt (1970), and the present work, than like integral parts of the verb phrase. The results of Experiment 2, unfortunately, do not encourage any psychological extrapolation from the PLG, nor do they corroborate Robson's intuitive claim that the *be* preceding predicate adjectives and past participles is one and the same, semantically empty (cp. Kruisinga & Erades, 1953), and distinct from those occurring with predicate nominals and locative phrases (Robson, 1972, p. 102). Experiment 1 and some of the developmental studies, however (see pp. 124ff., above), offer partial support for the notion that passive and perfective participles have highly, if not completely, overlapping functions.

A recent proposal by Langacker & Munro (1975) carries the Hasegawa and R. Lakoff analyses (pp. 63ff., 77-8, above) a step or two further, and suggests some rather interesting claims concerning the interpretation of passives. *Be* is treated as a meaningful existential predicate, taking as subject (or object) complement an embedded transitive clause with unspecified agent nominal; instrumental or agentive phrases derive by reduction from optional conjoined sentences where by or some other preposition is a semantically non-empty "predicate relating a sentential subject [like that embedded in the conjunct] and a typically non-sentential object" (p. 817). The existence of a single rule for carrying out what is generally called passivization is denied, as -- by implication, mainly -- in Hasegawa (1968), Langendoen (1969), and R. Lakoff (1971), to name but a few, and, of course, Robson (1972), discussed above. Unlike the latter, however, Langacker & Munro -- and the others just mentioned -- had no doubt as to the necessity of transformations in general, and the required object-preposing and other restructuring operations were effected by means of various raising rules.

While formally acknowledging the prevalence of agentless passives and impersonal constructions over full agentive passives, in many languages (Lyons, 1968; Svartvik, 1966), and also the widely-held assumption that all passives imply some sort of agency or causation, Langacker & Munro themselves "do not expect other scholars to accept [the conjoined-sentence source of agentives] without considerable discussion and further evidence" (pp. 817-8), even though this proposal too seems intuitively well-motivated. The analysis, to its further credit, avoids entirely the problem of passives without corresponding actives, since it derives the two types from quite different base structures. Implied agency in be -- V+ed predications, however, is no longer entirely an assumption, since the results of Experiment 2 (pp. 222ff., above) tend to confirm this long-held suspicion. And, as far as the reduced-conjunct view of optional agentive by-phrases embodies a cognitive claim concerning speakers' basic comprehension of these adjuncts, and not just a formal means of generating conjoined agency clauses, such claim would receive some support from the results of Experiment 1, as well. These inferences can only be conjectured, of course, for Langacker & Munro, like most grammarians, have by long tradition sought to account primarily for the distributional facts of language as they perceive them, and have generally tended to ignore ordinary speakers' concepts of linguistic structure.

As risky as it is, to apply behavioral data to hypotheses gleaned at second hand from grammars not written primarily with language behavior in mind, it is always tempting to do so, particularly with those occasional analyses which are less than totally concerned with the recursive enumeration of symbolic arrays, and which seem to put at least some of the formalism at the service of cognition, rather than the reverse. The treatment of be in recent analyses is a case in point: some claim it is a meaningful element (e.g., Langacker & Munro, 1975), and some claim it is devoid of content (e.g., Robson, 1972), but the fact that more and more grammars are assigning it a rather independent role in underlying syntactosemantic structure seems inevitably to imply the main hypothesis of Experiment 2, i.e., that passive predicates, like nominal and adjectival phrases, are all postverbal complement structures. The results of that experiment were equivocal in this regard -- they denied the supposed passive-adjective equivalence, but with some reservation -- but this outcome is not likely to affect grammars in any way, since most grammarians deny any accountability to behavioral facts in the first place, thus protecting their analyses in advance from the vagaries of human nature. Such being the case, no grammar which sets out primarily to codify the apparent distributional facts among an infinite set of potential well-formed sentences has the right to call itself *ipso facto* an account of human linguistic competence, and thus capitalize on those fortuitous outcomes wherein experimental results happen to confirm grammatical intuitions. Only when theorists are willing to limit their descriptions of language-structure cognition to what is empirically known about the matter, and to formulate unashamedly behavioral hypotheses, then live with the experimental results, will there be a truly responsible science of language use.

The strongest formal claim for the adjectival status of passives has come from Freidin (1975), who cites the overlapping distributions of adjectival and passive predicates, their appearance in the same surface positions in sentences, their susceptibility to modifier shift after relative clause reduction, and their tendency to exhibit the same sorts of ambiguity, as evidence for analyzing passive predicates outright as adjective-phrase complements to a copular be. Again, the distributional nature of an analysis puts it just beyond the reach of empirical evidence, but the fact that speakers do not treat these two phrase types as communicatively equivalent cannot be totally ignored, and must sooner or later be accommodated. A grammar cannot characterize as alike without qualification linguistic structures which are known to produce equivocal speaker reactions, and still expect to achieve credibility.

There are other aspects of Freidin's analysis which deserve examination, however, because they form part of the most thoroughgoing proposal in philosophical linguistics to date for a completely transformationless analysis of voice, and perhaps for a transformationless grammar, as well. The work is, in a way, the lexicalist-interpretivist response to an off-handed question once put by generative semanticist R. Lakoff: "Why passivize a sentence at all?" (1971, p. 149; see also pp. 77-8, above). Since the essential active-passive relation is at bottom a semantic one, in Freidin's view, and is not adequately expressed by any existing syntactic rule, it can and should be formalized as a rule of semantic interpretation; and since such rules can be formulated to operate on semantic functions which are defined independently of tree configurations, structure-preserving transformations such as the passive are no longer required, and passive surface structures can be generated directly in the base of the grammar.

Predicates are pivotal, in Freidin's theory: active and passive counterparts differ in form, but they are semantically equivalent, because they govern the same semantic relations with their respective co-occurring nominals, and in most cases entail the existence of one another. The ideal locus for the statement of these equivalences is claimed to be the lexicon, where all morphologically related forms sharing the same core of meaning can be specified, by listing or by rule, in one complex lexical entry. The entry for _give_, for example, would include, as the adjectival derivative, reference to a general morphological rule that every _V+ed_ is analyzed as an adjective. Selectional restrictions would be stated in terms of semantic functions (e.g., source, theme, goal, etc., in the case of verb forms), rather than syntactic categories and P-marker configurations, and would thus remain constant despite grammatical transformation.

The central active-passive relation in Freidin's theory ultimately finds expression in a rule of semantic interpretation which states that two sentences are cognitively synonymous if their respective predicates govern the same semantic functions, and if those functions are instantiated by the same lexical material. Judging from this, and from the treatment of active-passive verb alternates in the lexicon, Freidin's whole proposal appears to be founded on the assumption that passives and their active counterparts are paraphrases of one another. There is no doubt that such an assumption permeates the analysis, but the formalisms proposed are fortunately not limited to the expression of synonymy. The sentence interpretation rule is innocuous enough, but the kinds of lexical entries and rules which Freidin proposes (after Stockwell *et al.*, 1973, and Jackendoff, 1969), and upon which the formal determination of sentential synonymy hinges, are as amenable to the expression of near-equivalence as of equivalence and non-equivalence: if *buy from* - *sell to* counterparts, which supposedly entail one another and differ only with respect to the interpretation of agency, can be accommodated in Freidin's lexicon and interpretively labelled as near paraphrases (1975, p. 392), then so, surely, can voice opposites, even though their mutual entailment relations in terms of co-occurring nominals are not always commutative (*ibid*., p. 395).

The unqualified assumption of active-passive synonymy in Freidin's theory is simply not tenable. There has been too much philosophical argument against it, and too much disconfirmatory or at least equivocal empirical evidence, for it to be held as a basic premise and the cornerstone of a linguistic description (see Chapters 2 and 3, above). Descriptive systems ought, in any case, to describe what is, not what ought to be, and if variability of interpretation is what obtains among predicates and their co-occurrents, then the grammar ought to reflect both semantic near-equivalence and non-equivalence, wherever appropriate. The advantage of Freidin's model, however, despite the lack of fit between its basic premises and the empirical facts, is that it provides a prototype for potentially transformationless grammars, within the framework of a well-established theory of language description. And the advantage of that is that once currency is gained by the notion that the major surface constituent orders (and representations of their meaning) can be generated directly, without the intervention of empirically unsupported structure-alteration or deletion procedures, then the way will be open for grammatical meaning and information content to take their rightful place as the *describenda* of linguistic descriptions, rather than form and distributional regularity.

A Viable Competence Grammar

One transformationless grammar has been proposed, which is designed primarily to summarize the knowledge or ability of the native speaker, insofar as it is discernible -- and indeed must be discernible, in order to have been learned at all -- in the nested linear structure of sentences. Prideaux (1975) has noted that it is always an unsatisfying enterprise, to attempt to attach psychological interpretations to grammars which were not really meant to have them; better to follow Jespersen's advice (1924, p. 40) in grammar writing, and proceed from apparent functions and meanings to the form employed to convey them, rather than the reverse. Thus freed of the basic encumbrance hindering most of contemporary descriptive linguistics, Prideaux strives to "pair syntactic form with grammatical information" by means of "generalizations which are true at the surface," without resorting to such artifices as constituent movement, rule ordering, or "abstract underlying structures which are posited just so such generalizations can be stated" (pp. 5, 9). Such an 'information-structure' grammar thus epitomizes the current trend toward constraining the generativity of grammar rules, and is not only amenable to, but invites, psychological interpretation.

As the principal components of sentence meaning encoded into speech by speakers and decoded by hearers, Prideaux posits four types of information structure: contextual information, or the discourse-dependent assignment of relative salience to sentence constituents; sentential information, or the type of locution (e.g., declarative, interrogative), as conveyed by constituent order, intonation pattern, etc.; relational information, or the grammatical roles played by the various sentence constituents in relation to each other -- typically, subject, predicate, object, etc.; and denotational information, the semantic content of particular lexical items, as delimited, modified, specified, or enlarged upon, by linguistic devices signalling number, tense, aspect, qualification, location, negation, manner, and the like. The information-structure formation rules of the grammar enumerate the various choices apparently available to language users in each category, and specify whether these are optional or obligatory, conjunctive or disjunctive, independent or contingent. The lexicon lists the membership of each denctational category of the language, including nouns, verbs, etc., in the usual sense, and also the lexical exponents of the various syntactic formative classes, such as definiteness of determiner and perfectiveness of aspect. There may also be rules for the insertion of lexical material into sentences under certain co-occurrence conditions, such as those governing the do auxiliary in English.

The apparent regularities in terms of which the components of intended message content may be related to a linear speech signal are summarized in a few linearization and surface-structure redundancy rules. These cover such conventions as the preverbal placement of subject nominals, WH-forms, and yes/no question auxiliaries, in English, and the postverbal ordering of non-questioned direct and indirect object nominals. The rules are non-derivational and unordered, applying to whatever formatives fulfill the co-occurrence and class-membership conditions which are specified; many of the more contrived practices of transformationalism are thus avoided, such as the generation and manipulation of quasi-syntactic tense and affix nodes, and the vacuous successive fronting of the tense-bearing auxiliary and the questioned subject NP, in the generation of WH-NP -- VP questions.

In their general purpose and tone, the proposed rules are very reminiscent of the morpheme sequence-class rules of Zellig Harris (see pp. 37ff., above): both, in a sense, are concerned with enumerating the sentence types of the language and their permissible elaborations of hierarchical structure. The similarity ends there, however, for linearization rules do not abbreviate the grammar by describing instances of a type Y construction as variants of some more 'basic' type X; all sentence types are independently accounted for, in an information-structure grammar, and none is either 'basic' or 'derived,' with respect to another.

The one vital area of sentence structure not accounted for, in Prideaux' preliminary outline, is passive voice; considering the lack of reliable empirical evidence there has been about these sentence types, it is not surprising that the matter was left in abeyance. Those few encouraging results which have been reported, however, coupled with the findings of the present work, do suggest how active and passive sentences might be handled, in the information-structure model. Active sentences, to begin with, are no problem at all, since they are already quite adequately described, there; it is the passives which present difficulty, and indeed, accounting for the various passive subtypes is as complex a task for an information-structure grammar as it is for any formal analysis. The problem is not the 'machinery' of the grammar, for the linearization, lexical, and redundancy rules are quite capable in principle of reflecting the fact that subject 'victimhood,' verb participialization, and agency specification seem to be more or less independent form-meaning associations (Svartvik, 1966; Experiment 1, above). The main obstacle is the structure and meaning of the various passive sentence types themselves: how are they to be analyzed, in order to reflect the way they appear to be used and understood?

Despite the growing analytical trend towards treating all passive predicates as quasi-adjectival complements to a copular main verb _be_, there are indications that agentive passives are quite distinct from statals, and the results of Experiment 2 provide empirical evidence for the cognitive reality of these two distinct subclasses. Although they were not restricted to two-way sentence sorts, the subjects in that experiment exhibited an overwhelming tendency to dichotomize the stimulus set, and the main overall distinction made, after the inherently dichotomous singular/plural difference, was that between agentive and non-agentive postcopular adjuncts. Nominal and adjectival complements, in other words, were kept clearly apart from agentive _V+ed_ participles, and the supposedly non-agentive statal and attitudinal _V+ed_ predicates of sentence Type 5 were not grouped as a class apart, but were divided between the agentive passives and the _be_ -- ADJ predications, in accordance with whether a remote association with some sort of causative agency could be evoked, in the context of each individual sentence. The way in which particular instances of the 'statal passive' were dealt with varied considerably from person to person, but it was clear that the decision being made by most subjects was a 'static/qualitative' vs. 'dynamic/eventive' one; the degree to which verb participles can take on the syntactic and semantic functions of adjectives would thus seem to be fairly limited as yet, in English, and dependent on individual speakers' interpretations, as well as on discourse context.

In order to account for the principal variants of the two major passive types, sentences such as the following, at least, ought to be characterized in a grammatical description:

P1. Our suggestion was ignored by the authorities.
P2. Several lawyers were appointed to the commission.
P3. The goaltender was injured.
P4. The company representative's report was biased.
P5. The scientists were devoted to their research.

The first question that arises, in connection with accommodating these in an information-structure grammar (ISG), is whether passiveness ought to be formalized as a sentence-type option in the rule specifying 'sentential' information (Prideaux, 1975, p. 19). The answer is no, because experiments have shown that passiveness is not just an overall message-type characteristic signalled by some particular constituent order: it is the complex semantic relations among constituents which define voice, and these are conveyed -- in English, at least -- by various morphological and syntactic devices (Baker *et al.*, 1973; Reid, 1974b, forthcoming [c]). Most of these devices are already part of the ISG, and need only be eked out by the addition of 'passive' as a verb-aspect option, lexicalized as *be* with obligatory participialization of the next verb-phrase element.

The main problem, with respect to the ISG and passives, is whether SUBJ(ect) information structure, as defined, correctly determines the 'leftmost' NP of a sentence. Under certain conditions, a preverbal (i.e., SUBJ) NP is interpreted as the patient rather than the agent in the sentential event, and not because of any overt marking on the NP itself or on the following verb phrase -- as in passives -- but because of the *absence* of any other constituent interpretable as patient in the sentence, as in:

(a) That football kicks easily.

vs. (b) *That football kicks children easily.

Postverbally adjoined NPs also have a variety of interpretations, including agent and patient, depending not only on position but also on co-occurrents and implicit meaning. Given inherent agentiveness, a *by*-phrase NP preceded by a passive verb phrase with preverbal NP interpretable as patient will be understood as the agent, but as a manner or locative adverbial, otherwise:

(c) Theseus was sent a fleece by Jason.

(d) Theseus was sent a fleece by airmail.

(e) Theseus sent a fleece by Jason.

Semantic interpretation, in other words, is as much a function of collocation as it is of syntactic and morphological marking; the ISG thus needs only minor interpretive revision, in order to account for the structure and meaning of the passive sentence types as well as it does for predicatives and actives.

There appear to be at least two non-agentive interpretations of the SUBJ constituent in passives, i.e., _patient_ (in agentive passives), and _experiencer_, as in statals and _be_ -- PRED constructions. Thus, if the first NP in a _be_ -- _V+ed_ predication is that labelled 'SUBJ,' the grammar will provide for its interpretation in either case as 'non-agent' simply through passive verb morphology, for the privative concept of non-agency is precisely what linguistic tradition has said is signalled by a passivized verb phrase (cf. Joos, 1964 [pp. 35-36, above]). This approach makes SUBJ a sort of portemanteau constituent, but it is probably preferable to the invention of an autonomous 'agent' constituent, which would be _ad_ _hoc_ and something of a departure from the basically _grammatical_ roles assigned to syntactic constituents in the ISG. But since the semantic interpretation of preverbal SUBJ NPs seems to depend on the total context, as Prideaux also pointed out (pp. 15-16), the interpretive import of the 'SUBJ' label in the grammar must be more than just 'preverbal position in declarative and interrogative sentences' or the like; the formal definition of 'SUBJ-hood' must also encompass such notions as 'interpretable as agent if in preverbal position in a D or Q sentence and followed by a non-passive verb phrase without subsequent DO; or as patient if . . .' and so on.

The information-structure model makes it quite clear that its rules are not derivational formulas, but only statements of apparent form-meaning correspondence; constituents are defined to have various constrained privileges of occurrence, and certain semantic interpretations are implied in each case. Thus, no grammatical subject ever 'becomes' a postverbal agent, nor does any grammatical object 'become' the subject; 'postverbal agent' is what a by-phrase nominal is, in agentive passive constructions, unless co-occurrents and inherent meaning dictate otherwise (see examples c - e, above). Passive declaratives like P1 - P5, above, can thus be quite simply accounted for, in an information-structure grammar. Passive negatives and questions can presumably also be described with little further revision of the existing rules, and so, probably, can the occasional passive imperative. If and when there is more reliable evidence in favor of the be -- Complement analysis of at least one class of passives (the statals), that part of the grammar -- to date relatively unelaborated -- can begin to undergo further development.

Conclusion

Many models of grammar have been reviewed or commented upon in this chapter, each with its positive and negative attributes. Some are worked out in detail, and some not; some espouse the subject-object inversion principle, and some do not; and some seem to be making an attempt to come to grips with reality, but most, unfortunately, are not. If there has been a trend away from the classical passive transformation in recent years, it has been for reasons of descriptive power and economy, not because the rule has scant psycholinguistic relevance; its derivational effects keep resurfacing in other parts of grammars, in any event, making even less sense than before.

Insofar as they represent a step in the direction of an empirically-based theory of linguistic cognition, these 'PASSIVE-less' grammars are welcome. The only proposal deserving whole-hearted approbation, however, despite its incompleteness, is the information-structure model, for it alone represents a complete break with the abstract automatisms of generative-transformational dogma, coupled with an honest attempt to compile inductive generalizations concerning sentence structure, as they might be learned and applied by speakers. It is almost as if a sadder but wiser return were being made to a more pragmatic era, when it could with impunity be speculated that:

> The frequency of slips, new formations, and so on is enough to make us feel that the bulk of the major structural features are indeed reflected in speaking habits -- habits which are presumably based, like the

> linguist's analysis, on the distributional facts. (Harris, 1954, pp. 150-1)

Ultimately, every grammar must be based on the apparent distributional facts of the language; but, because speakers are memory-dependent organisms of limited capacity, and not abstract automata, there is a limit to the depth of intuitive generalization to which a grammar may go, if it aims for serious consideration as a theory of linguistic cognition. Some encouraging steps have been taken, towards constraining the analytic excesses of linguistic descriptions; the day when these scattered endeavors become a trend back to linguistic reality is eagerly looked forward to.

Summary

This thesis began by tracing the history of the voice concept in grammar back to its Graeco-Latin origins, where despite fairly unequivocal morphological inter-relations, active and passive verb forms were perceived as implying actio and passio, respectively, and were classified as different verb types. The early grammars of English were largely based on those of classical Latin and Greek, and verbs continued to be differentiated in terms of 'being,' 'doing,' and 'suffering' until well into the 18th century. Eventually, it was recognized that passive participles are not a type of verb as such, but co-occur with a form of be or get in a verb phrase, preceded by a 'patient' nominal and followed by an agent, in a by-phrase (cf. Michael, 1970).

The near-synonymy of passive sentences and their inversely-related active counterparts -- first mentioned by Ward, in 1765 -- became a widely-accepted doctrine, in the 19th and 20th centuries; credit for the latter is due mainly to the compendious and influential 'scholarly' grammars of Jespersen and others, who also noted the prevalence of agentless passives over agentful, in actual language use. To those who advocated the study of language as patterns of form, rather than of meaning, however, sentential synonymy was beside the point, for no formal difference between passives and other sorts of 'bipartite' sentence was acknowledged (Bloomfield, 1933; Bloch & Trager, 1942; Kruisinga & Erades, 1953).

The notion that active and passive sentences are transforms of one another, with actives as the more 'basic' turn of phrase, remained the dominant view of voice for generations, and most grammarians acknowledged it, in one way or another, as a means of simplifying their language descriptions. Zellig Harris first formalized the relation as a quasi-algebraic statement of the discourse-context equivalence of voice opposites (1957); Noam Chomsky made it a fundamental sentence-type option in an ordered formal deductive system of rules for deriving well-formed formulas representing the grammatical sentences of a language (1957); both, however, intended the passive transformation rule as an abbreviatory device, whereby a whole class of sentences -- with two or more subclasses, counting agentless passives and 'pseudopassives' -- could be simply accounted for as variants of an already-defined 'kernel' type. Subsequent developments in generative-transformational theory derived actives and passives from different abstract representations of sentential content and meaning, by means of a sequence of transformational operations whose co-ordinate purpose was now to generate linear representations of those sentences which would be understood to convey the underlying meanings in question (Chomsky, 1965, 1971; G. Lakoff, 1971). Whether or not the different underlying representations -- and hence, the different derivations -- of active and passive sentences were meant to imply non-synonymy on the part of these sentence types remains a moot point (Freidin, 1975; Langacker & Munro, 1975).

At the same time, some currency was gained by the notion that the three principal aspects of the grammatical voice alternation -- patient vs. agent as subject, presence vs. absence of be...-ed in the verb phrase, and agentive by-phrase vs. direct object, postverbally -- appear to have a certain amount of distributional independence, since they occur individually in sentence types not usually thought of as passive, and do not always co-occur in those sentences which are generally recognized as passives. A number of proposals were advanced, whereby grammars could be revised to reflect these apparent distributional facts, and indeed whereby the passive transformation might be abandoned altogether, letting its disparate facets be treated descriptively as instances of more general constituent-fronting and extraposition phenomena (Chomsky, 1970; R. Lakoff, 1971; Stockwell et al., 1973). Arguments have even been presented, based on distributional and empirical evidence, respectively, for generating passives in their surface constituent order, and doing away with the subject-object inversion and other transformations completely (Robson, 1972; Prideaux, 1975).

The empirical background of grammatical voice as a psycholinguistic phenomenon was also reviewed in detail, beginning with a comprehensive taxonomic study of be -- V+ed constructions in written English by Svartvik (1966). He found six basic types of passive, ranging from full agentive passives, unequivocally relatable to transitive active counterparts, through ambiguously agentive, agentless, quasi-agentive, and non-agentive phrases, only remotely relatable to some active, if at all. The 'passive scale,' with a number of syntactic and semantic factors apparently operating in slightly different combinations at each stage, was proposed as a more realistic view of the voice phenomenon than the rigid and arbitrary dichotomy espoused by transformationalism.

Experimental investigations of voice virtually date from G. A. Miller's promulgation of the 'derivational theory of complexity' (1962), an outgrowth of the psychologization of generative-transformational grammar by Chomsky (1959). After some encouraging initial results, the greater processing difficulty predicted by the DTC for passives became almost impervious to empirical test, with extraneous variables of all sorts beclouding the interpretation of results. For example, a number of attempts to establish the psychological reality of Yngve's linear theory of sentence production (1960) vs. a generative-transformational model yielded mainly equivocal outcomes, because the experimental manipulation of 'mean depth' through 'left branching' phrase structure had no consistent transformational correlate (J. F. Miller, 1973). Experiments with sentence 'families' generated by varying voice, mood, modality, and other syntactic variables also proved inconclusive, because many workers ignored the variations in grammatical meaning which were engendered in their sentential stimuli, through the systematic alternation of what they thought was pure syntax (Baker _et al._, 1973).

In spite of the many ambiguities of interpretation and the occasional negative result, the preponderant weight of accumulated evidence continued to suggest that passivization somehow complicates matters, but it remained altogether unclear how. Probably the least controvertible evidence came from the developmental studies, which showed that children gain control over passive locutions much later than actives, and over agentless passives before agentful ones (Turner & Rommetveit, 1967a; Bates, 1969). Studies of the internal syntactosemantic structure of sentences, and of their contexts of occurrence, furthermore, led to the realization that interconstituent relations in passives do not mirror those of actives, that passives are used to talk about basically different kinds of things than are actives, and that both the discourse and situational context can make one form appropriate, to the exclusion of the other. Actives and passives, in other words, are seldom interchangeable in use, to the point of being alternative ways of saying the same thing, as has so often been claimed (Carroll, 1958; Clark & Begun, 1968; Hornby, 1972, 1974); although the classical active-passive relation has undeniable descriptive utility, the lack of fit on so many fronts between the implications of grammar and actual language use militates against the passive (or any other) transformation having relevance to sentence production or interpretation, except perhaps as part of some speakers' 'archival' awareness of language structure (Watt, 1970).

The general position adopted in this thesis, as a consequence of both the philosophical and the empirical findings involving grammatical voice, is that sentences are produced and understood linearly, from start to finish, their inherently hierarchical structure being much more 'shallow' than has generally been supposed, and governed by the limitations of human memory. Although certain structural and semantic regularities are discernible among all sentence types occurring in conversation, most speakers remain quite unaware of these abstract archival relations, it is here claimed, and such knowledge does not in any case play a part in the speaking or understanding of sentences themselves. The active-passive relation in particular is called into question: its syntactosemantic components have too many independent associations outside the voice phenomenon for the rule to have any reality as a unified psycholinguistic process. Active and passive sentences, furthermore, are as amenable to independent formulation in the minds of speakers as are any other more or less grammatically related locution types, and this ought to be evident in the ascendancy of shallow 'paradigmatic' similarities among sentence types over the abstract 'deep' resemblances postulated by transformational grammar.

An experiment designed to test the former ('independence') hypothesis found the concept of voice to be more easily identifiable in the verb phrase than in postverbal constituents. Understandably, the morphological and semantic properties common to past tense, passive voice, and perfective aspect were a source of confusion, in distinguishing among sentence-type variants. Although the agentive implications of sentence subjects vs. their 'patienthood' in actives and passives were not tested, in this experiment, it was reasoned, on the basis of previous work, that subject nominals have no independently interpretable role apart from some verb phrase, in any case. The results of the experiment were judged to constitute empirical support for the view that the active-passive alternation in English -- an unnatural juxtaposition of sentence types in ordinary language use -- is basically fragmentary in nature, involving the bringing together in the same utterance of two or more syntactosemantic devices having overlapping but non-coterminous privileges of occurrence, and numerous ambiguities of meaning association, as suggested by Svartvik (1966).

A second experiment, meant to test the 'paradigmatic similarity' hypothesis, met with somewhat less success than the first. On the presumption that passives are as much a _be_ -- _Complement_ structure as are _be_ -- NP and _be_ -- ADJ statements, and rather more like the latter than the former, subjects were asked to sort out instances of these locution types as 'different kinds of things to say' about a topic. The fact that sentence-subject plurality was the principal distinction made among all sentences indicates that the differences among types of _be_ predication are either not immediately obvious or not of prime importance; it follows, in either case, that the three kinds of sentence are, to a limited extent, at least, not adverted to as 'different manners of speaking.' And yet, the further fact that passive and non-passive sentences were clearly segregated, at lower levels of the differentiation hierarchy, precludes the attribution of either main-verb status to passive _be_, or of postverbal complement status to _V+ed_ participles, even though other formal features having nothing to do with predicate constituents played a significant part in the further subdivision of _be_-predication types. Recent grammatical proposals involving copular be -- Complement analyses of passives can thus be given only partial credence, as representations of native speaker knowledge; the hypothesis is not totally denied by the results of Experiment 2, however, and further, more enlightened experimental tests might yield more encouraging results.

The thesis concluded with a discussion of a recent proposal for a non-transformational model of grammar, designed to summarize speakers' functional linguistic competence as a set of learnable generalizations from the apparent nested linear structure of sentences, with some inter-type correspondence rules as a sort of 'archival' component (Prideaux, 1975). Some suggestions were made, whereby the 'information-structure' rules and 'linearization' rules of the grammar might be revised, in light of what is empirically known about grammatical voice, in order to accommodate active and passive versions of the basic declarative, interrogative, and imperative sentence types already accounted for. Despite its fledgling state of development, the information-structure model is applauded as the first significant step in years towards making theoretical linguistics responsible to empirical facts, as well as to philosophical supposition.

REFERENCES

Anderson, J. R. Verbatim and Propositional Representation of Sentences in Immediate and Long-Term Memory. *Journal of Verbal Learning and Verbal Behavior*, 1974, 13, 149-62.

Anderson, S. R., & Kiparsky, P. (Eds.). *A Festschrift for Morris Halle*. New York: Holt, Rinehart, & Winston, 1973.

Andre, T. Clustering in the Free Recall of Sentences. *Psychological Reports*, 1973, 32, 971-4.

Andrew, C. M. An Experimental Approach to Grammatical Focus. Unpublished doctoral dissertation, University of Alberta, 1974.

Bach, E. *Have* and *Be* in English Syntax. *Language*, 1967, 43, 462-85.

Bach, E. Nouns and Noun Phrases. In Bach, E., & Harms, R. T. (Eds.), *Universals in Linguistic Theory*. New York: Holt, Rinehart, & Winston, 1968.

Bach, E. *Syntactic Theory*. New York: Holt, Rinehart, & Winston, 1974.

Bacharach, V. R., & Kellas, G. Phrase versus Base Structure Effects on Short-Term Retention. *Journal of Verbal Learning and Verbal Behavior*, 1971, 10, 171-5.

Baker, W. J., & Prideaux, G. D. Grammatical Simplicity versus Performative Efficiency. *Resources in Education*, 1975, 10.

Baker, W. J., Prideaux, G. D., & Derwing, B. L. Grammatical Properties of Sentences as a Basis for Concept Formation. *Journal of Psycholinguistic Research*, 1973, 2, 201-20.

Bates, R. R. A Study in the Acquisition of Language (Doctoral dissertation, University of Texas at Austin, 1969). *Dissertation Abstracts International*, 1970, 30, 5427-A. (University Microfilms No. 70-10748)

Beilin, H. *Studies in the Cognitive Basis of Language Development*. New York: Academic Press, 1975.

Bever, T. G. The Cognitive Basis for Linguistic Structures. In Hayes, J. R. (Ed.), *Cognition and the Development of Language*. New York: Wiley & Sons, 1970.

Bloch, B., & Trager, G. L. *Outline of Linguistic Analysis*. Baltimore: Linguistic Society of America, 1942.

Bloomfield, L. *An Introduction to the Study of Language*. New York: Henry Holt & Co., 1914.

Bloomfield, L. A Set of Postulates for the Science of Language. *Language*, 1926, 2, 153-64.

Bloomfield, L. *Language*. New York: Henry Holt & Co., 1933.

Blumenthal, A. L. Prompted Recall of Sentences. *Journal of Verbal Learning and Verbal Behavior*, 1967, 6, 203-6.

Blumenthal, A. L., & Boakes, R. Prompted Recall of Sentences. *Journal of Verbal Learning and Verbal Behavior*, 1967, 6, 674-76.

Boas, F. *Introduction to the Handbook of American Indian Languages* (Bulletin No. 40, Part 1). Washington: Bureau of American Ethnology, Smithsonian Institution, 1911. (Reprinted by Georgetown University Press, 1963.)

Botha, R. P. *The Methodological Status of Grammatical Argumentation*. The Hague: Mouton & Co., 1970.

Botha, R. P. *The Justification of Linguistic Hypotheses*. The Hague: Mouton & Co., 1973.

Bregman, A. S., & Strasberg, R. Memory for the Syntactic Form of Sentences. *Journal of Verbal Learning and Verbal Behavior*, 1968, 7, 396-403.

Carroll, J. B. Process and Content in Psycholinguistics. In Glaser, R., *et al*., *Current Trends in the Description and Analysis of Behavior*. Pittsburgh: University of Pittsburgh Press, 1958.

Caws, P. *The Philosophy of Science: a Systematic Account*. Princeton, N.J.: Van Nostrand, 1965.

Chafe, W. *Meaning and the Structure of Language*. Chicago: University of Chicago Press, 1970.

Chomsky, N. Three Models for the Description of Language. *I.R.E. Transactions on Information Theory*, 1956, IT-2, 113-24. (Reprinted in Luce, R. D., Bush, R. R., & Galanter, E. [Eds.], *Readings in Mathematical Psychology*, II. New York: Wiley & Sons, 1965.)

Chomsky, N. *Syntactic Structures*. The Hague: Mouton & Co., 1957.

Chomsky, N. Review of Skinner, B. F., *Verbal Behavior*. *Language*, 1959, 35, 26-58.

Chomsky, N. On the Notion 'Rule of Grammar.' *Proceedings of the Twelfth Symposium in Applied Mathematics*, 1961, XII, 6-24. (a) (Reprinted in Fodor, J. A., & Katz, J. J. [Eds.], *The Structure of Language*. Englewood Cliffs, N.J.: Prentice-Hall, 1964.)

Chomsky, N. Some Methodological Remarks on Generative Grammar. *Word*, 1961, 17, 219-39. (b)

Chomsky, N. A Transformational Approach to Syntax. In Hill, A. A. (Ed.), *Third Texas Conference on Problems in the Analysis of English (1958)*. Austin: University of Texas, 1962. (Reprinted in Fodor, J. A., & Katz, J. J. [Eds.], *The Structure of Language*. Englewood Cliffs, N.J.: Prentice-Hall, 1964.)

Chomsky, N. *Current Issues in Linguistic Theory*. The Hague: Mouton & Co., 1964.

Chomsky, N. *Aspects of the Theory of Syntax*. Cambridge, Mass.: M.I.T. Press, 1965.

Chomsky, N. *Cartesian Linguistics*. New York: Harper & Row, 1966. (a)

Chomsky, N. *Topics in the Theory of Generative Grammar*. The Hague: Mouton & Co., 1966. (b)

Chomsky, N. *Language and Mind*. New York: Harcourt, Brace, & World, 1968.

Chomsky, N. Remarks on Nominalization. In Jacobs, R. A., & Rosenbaum, P. S. (Eds.), *Readings in English Transformational Grammar*. Waltham, Mass.: Ginn & Co., 1970.

Chomsky, N. Deep Structure, Surface Structure, and Semantic Interpretation. In Steinberg, D. D., & Jakobovits, L. A. (Eds.), *Semantics: an Interdisciplinary Reader in Philosophy, Linguistics, and Psychology*. Cambridge: Cambridge University Press, 1971.

Chomsky, N. Some Empirical Issues in the Theory of Transformational Grammar. In Peters, S. (Ed.), *Goals of Linguistic Theory*. Englewood Cliffs, N.J.: Prentice-Hall, 1972.

Chomsky, N. Conditions on Transformations. In Anderson, S. R., & Kiparsky, P. (Eds.), *A Festschrift for Morris Halle*. New York: Holt, Rinehart, & Winston, 1973.

Clark, H. H. Some Structural Properties of Simple Active and Passive Sentences. *Journal of Verbal Learning and Verbal Behavior*, 1965, 4, 365-70.

Clark, H. H. Semantics and Comprehension. In Sebeok, T. A. (Ed.), *Current Trends in Linguistics* (Vol. 12, Part 3). The Hague: Mouton & Co., 1974.

Clark, H. H., & Begun, J. S. The Use of Syntax in Understanding Sentences. *British Journal of Psychology*, 1968, 59, 219-29.

Clark, H. H., & Begun, J. S. The Semantics of Sentence Subjects. *Language and Speech*, 1971, 14, 34-46.

Clifton, C., Kurcz, I., & Jenkins, J. J. Grammatical Relations as Determinants of Sentence Similarity. *Journal of Verbal Learning and Verbal Behavior*, 1965, 4, 112-17.

Clifton, C., & Odom, P. Similarity Relations among Certain English Sentence Constructions. *Psychological Monographs*, 1966, 80, No. 5.

Coleman, E. B. The Comprehensibility of Several Grammatical Transformations. *Journal of Applied Psychology*, 1964, 48, 186-90.

Coleman, E. B. Learning of Prose Written in Four Grammatical Transformations. *Journal of Applied Psychology*, 1965, 49, 332-41.

Curme, G. O. *Syntax*. Boston: Heath & Co., 1931.

Curme, G. O. *Parts of Speech and Accidence*. Boston: Heath & Co., 1935.

Curme, G. O. *English Grammar*. New York: Barnes & Noble, 1947.

Danks, J. H., & Sorce, P. A. Imagery and Deep Structure in the Prompted Recall of Passive Sentences. *Journal of Verbal Learning and Verbal Behavior*, 1973, 12, 114-17.

Davidson, R. E. Transitional Errors and Deep Structure Differences. *Psychonomic Science*, 1969, 14, 293-4.

Deese, J., & Hulse, S. H. *The Psychology of Learning* (3rd ed.). New York: McGraw-Hill, 1967.

Derwing, B. L. *Transformational Grammar as a Theory of Language Acquisition*. Cambridge: Cambridge University Press, 1973.

Epstein, W. Some Conditions of the Influence of Syntactical Structure on Learning: Grammatical Transformation, Learning Instructions, and 'Chunking.' *Journal of Verbal Learning and Verbal Behavior*, 1967, 6, 415-19.

Epstein, W. Recall of Word Lists Following Learning of Sentences and of Anomalous and Random Strings. *Journal of Verbal Learning and Verbal Behavior*, 1969, 8, 20-25.

Ervin-Tripp, S., & Slobin, D. I. Psycholinguistics. *Annual Review of Psychology*, 1966, 17, 435-74.

Esper, E. A. *Mentalism and Objectivism in Linguistics*. New York: American Elsevier, 1968.

Feltkamp, H. W. On Idealizing Native Speakers. *Neophilologus*, 1971, 55, 234-45.

File, S. E., & Jew, A. Syntax and the Recall of Instructions in a Realistic Situation. *British Journal of Psychology*, 1973, 64, 65-70.

Fillenbaum, S. Memory for Gist: Some Relevant Variables. *Language and Speech*, 1966, 9, 217-27.

Fillenbaum, S. On the Use of Memorial Techniques to Assess Syntactic Structures. *Psychological Bulletin*, 1970, 73, 231-37.

Fillenbaum, S. Psycholinguistics. *Annual Review of Psychology*, 1971, 22, 251-308.

Fillenbaum, S. *Syntactic Factors in Memory*? The Hague: Mouton & Co., 1973.

Fillmore, C. J. The Case for Case. In Bach, E., & Harms, R. T. (Eds.), *Universals in Linguistic Theory*. New York: Holt, Rinehart, & Winston, 1968.

Fillmore, C. J. Some Problems for Case Grammar. In Fillmore, C. J. (Ed.), *Working Papers in Linguistics* (No. 10). Columbus: Dept. of Linguistics, Ohio State University, 1971.

Fletcher, P. J. Case Grammar: Its Viability as an Alternative Grammatical Model. *Lingua*, 1971, 28, 237-50.

Fletcher, P. J. An Experimental Approach to Syntactic Paraphrase. Unpublished doctoral dissertation, University of Alberta, 1973.

Fodor, J. A., Bever, T. G., & Garrett, M. *The Psychology of Language: an Introduction to Psycholinguistics and Generative Grammar*. New York: McGraw-Hill, 1974.

Fodor, J. A., & Garrett, M. Some Reflections on Competence and Performance. In Lyons, J., & Wales, R. J. (Eds.), *Psycholinguistics Papers*. Edinburgh: Edinburgh University Press, 1966.

Fodor, J. A., & Garrett, M. Some Syntactic Determinants of Sentential Complexity. *Perception and Psychophysics*, 1967, 2, 289-96.

Frary, L. G. *Studies in the Syntax of the Old English Passive, with Special Reference to the Use of Wesan and Weorthan* (Language Dissertation No. 5). Baltimore: Linguistic Society of America, 1929.

Fraser, C., Bellugi, U., & Brown, R. Control of Grammar in Imitation, Comprehension, and Production. *Journal of Verbal Learning and Verbal Behavior*, 1963, 2, 121-35.

Freidin, R. The Analysis of Passives. *Language*, 1975, 51, 384-405.

Fries, C. C. *The Structure of English*. New York: Harcourt, Brace, 1952.

Garrod, S., & Trabasso, T. A Dual-memory Information Processing Interpretation of Sentence Comprehension. *Journal of Verbal Learning and Verbal Behavior*, 1973, 12, 155-67.

Glucksberg, S., & Danks, J. H. Grammatical Structure and Recall: a Function of the Space in Immediate Memory or of Recall Delay? *Perception and Psychophysics*, 1969, 6, 113-17.

Goldman, S. R., & Perfetti, C. A. The Effects of Sentence Structure and Thematic Structure on the Recall of Information from Passages. Paper presented to the 81st annual convention of the American Psychological Association, Montreal, 1973.

Goldman-Eisler, F., & Cohen, M. Is N, P, and PN Difficulty a Valid Criterion of Transformational Operations? *Journal of Verbal Learning and Verbal Behavior*, 1970, 9, 161-66.

Gough, P. B. Grammatical Transformations and Speed of Understanding. *Journal of Verbal Learning and Verbal Behavior*, 1965, 4, 107-11.

Gough, P. B. The Verification of Sentences: the Effects of Delay of Evidence and Sentence Length. *Journal of Verbal Learning and Verbal Behavior*, 1966, 5, 492-6.

Graham, N. C. Short Term Memory and Syntactic Structure in Educationally Subnormal Children. *Language and Speech*, 1968, 11, 209-19.

Greenberg, J. H. Some Universals of Grammar, with Particular Reference to the Order of Meaningful Elements. In Greenberg, J. H. (Ed.), *Universals of Language* (2nd ed.). Cambridge, Mass.: M.I.T. Press, 1966.

Greene, J. *Psycholinguistics: Chomsky and Psychology*. Harmondsworth, Middlesex: Penguin Books, 1972.

Grieve, R., & Wales, R. J. Passives and Topicalization. *British Journal of Psychology*, 1973, 64, 173-82.

Halliday, M. A. K. Syntax and the Consumer (Georgetown University Monograph Series on Languages and Linguistics, 17, 11-24). Washington, D.C.: Georgetown University Institute of Languages and Linguistics, 1964.

Harris, Z. S. *Structural Linguistics*. Chicago: University of Chicago Press, 1951.

Harris, Z. S. Discourse Analysis. *Language*, 1952, 28, 1-30.

Harris, Z. S. Distributional Structure. *Word*, 1954, 10, 146-62.

Harris, Z. S. Co-occurrence and Transformation in Linguistic Structure. *Language*, 1957, 33, 283-340.

Harwood, F. W. Quantitative Study of the Speech of Australian Children. *Language and Speech*, 1959, 2, 236-71.

Hasegawa, K. The Passive Construction in English. *Language*, 1968, 44, 230-43.

Hayhurst, H. Some Errors of Young Children in Producing Passive Sentences. Journal of Verbal Learning and Verbal Behavior, 1967, 6, 654-60.

Healy, A. F., & Miller, G. A. The Verb as the Main Determinant of Sentence Meaning. Psychonomic Science, 1970, 20, p. 372.

Healy, A. F., & Miller, G. A. The Relative Contribution of Nouns and Verbs to Sentence Acceptability and Comprehensibility. Psychonomic Science, 1971, 24, 94-96.

Herriot, P. The Comprehension of Sentences as a Function of Grammatical Depth and Order. Journal of Verbal Learning and Verbal Behavior, 1968, 7, 938-41.

Herriot, P. The Comprehension of Active and Passive Sentences as a Function of Pragmatic Expectations. Journal of Verbal Learning and Verbal Behavior, 1969, 8, 166-69.

Hill, A. A. Introduction to Linguistic Structures. New York: Harcourt, Brace, 1958.

Hinds, J. Passives, Pronouns, and Themes and Rhemes. Glossa, 1975, 9, 79-106.

Hockett, C. F. The State of the Art. The Hague: Mouton & Co., 1968.

Hornby, P. A. The Psychological Subject and Predicate. Cognitive Psychology, 1972, 3, 632-42.

Hornby, P. A. Surface Structure and Presupposition. Journal of Verbal Learning and Verbal Behavior, 1974, 13, 530-38.

Huttenlocher, J., Eisenberg, K., & Strauss, S. Comprehension: Relation between Perceived Actor and Logical Subject. Journal of Verbal Learning and Verbal Behavior, 1968, 7, 527-30.

Huttenlocher, J., & Weiner, S. L. Comprehension of Instructions in Varying Contexts. Cognitive Psychology, 1971, 2, 369-85.

Jackendoff, R. Some Rules of Semantic Interpretation for English. Unpublished doctoral dissertation, M.I.T., 1969.

Jakobson, R. Implications of Language Universals for Linguistics. In Greenberg, J. H. (Ed.), *Universals of Language* (2nd ed.). Cambridge, Mass.: M.I.T. Press, 1966.

James, C. T. Theme and Imagery in the Recall of Active and Passive Sentences. *Journal of Verbal Learning and Verbal Behavior*, 1972, 11, 205-11.

James, C. T., Thompson, J. G., & Baldwin, J. M. The Reconstructive Process in Memory. *Journal of Verbal Learning and Verbal Behavior*, 1973, 12, 51-63.

Jespersen, O. *A Modern English Grammar on Historical Principles* (7 vols.). London: Allen & Unwin, 1909-1949.

Jespersen, O. *The Philosophy of Grammar*. New York: Henry Holt & Co., 1924.

Jespersen, O. *Essentials of English Grammar*. London: Allen & Unwin, 1933.

Johnson, M. G. Syntactic Position and Rated Meaning. *Journal of Verbal Learning and Verbal Behavior*, 1967, 6, 240-46.

Johnson, S. C. Hierarchical Clustering Schemes. *Psychometrika*, 1967, 32, 241-54.

Johnson-Laird, P. N. The Choice of the Passive Voice in a Communicative Task. *British Journal of Psychology*, 1968, 59, 7-15. (a)

Johnson-Laird, P. N. The Interpretation of the Passive Voice. *Quarterly Journal of Experimental Psychology*, 1968, 20, 69-73. (b)

Johnson-Laird, P. N. Experimental Psycholinguistics. *Annual Review of Psychology*, 1974, 25, 135-60.

Johnson-Laird, P. N. Is All that Is Not Verse Just Prose? *Nature*, 1975, 255, 263-4.

Joos, M. *The English Verb: Form and Meanings*. Madison: University of Wisconsin Press, 1964.

Katz, J. J. *The Philosophy of Language*. New York: Harper & Row, 1966.

Katz, J. J., & Fodor, J. A. The Structure of a Semantic Theory. *Language*, 1963, 39, 170-210.

Katz, J. J., & Postal, P. M. *An Integrated Theory of Linguistic Descriptions*. Cambridge, Mass.: M.I.T. Press, 1964.

Koplin, J. H., & Davis, J. Grammatical Transformations and Recognition Memory of Sentences. *Psychonomic Science*, 1966, 6, 257-8.

Kruisinga, E. *A Handbook of Present-Day English* (Part II, 1, 5th ed.). Groningen: P. Noordhoff, 1931.

Kruisinga, E., & Erades, P. A. *An English Grammar* (Vol. 1, 8th ed.). Groningen: P. Noordhoff, 1953.

Lakoff, G. *Irregularity in Syntax*. New York: Holt, Rinehart, & Winston, 1970.

Lakoff, G. On Generative Semantics. In Steinberg, D. D., & Jakobovits, L. A. (Eds.), *Semantics: an Interdisciplinary Reader in Philosophy, Linguistics, and Psychology*. Cambridge: Cambridge University Press, 1971.

Lakoff, R. Passive Resistance. In Adams, D., *et al.* (Eds.), *Papers from the Seventh Regional Meeting of the Chicago Linguistic Society* (April, 1971). Chicago: Chicago Linguistic Society, 1971.

Lane, H., & Schneider, B. Some Discriminative Properties of Syntactic Structures. *Journal of Verbal Learning and Verbal Behavior*, 1963, 2, 457-61.

Langacker, R. W., & Munro, P. Passives and their Meaning. *Language*, 1975, 51, 789-830.

Langendoen, D. T. *The Study of Syntax: The Generative-Transformational Approach to the Structure of American English*. New York: Holt, Rinehart, & Winston, 1969.

Lees, R. B. *The Grammar of English Nominalizations*. The Hague: Mouton & Co., 1960.

Lees, R. B. On Passives and Imperatives in English. *Gengo Kenkyu*, 1964, 46, 28-41.

Leopold, W. F. Patterning in Children's Language Learning. *Language Learning*, 1953, 5, 1-14.

Lepschy, G. C. *A Survey of Structural Linguistics*. London: Faber & Faber, 1970.

Levelt, W. J. M., & Bonarius, M. Suffixes as Deep Structure Clues (Heymans Bulletin No. 22X). Groningen: Heymans Psychological Institute, Groningen University, 1968.

Lippman, M. Z. The Influence of Grammatical Transform in a Syllogistic Reasoning Task. *Journal of Verbal Learning and Verbal Behavior*, 1972, 11, 424-30.

Lyons, J. *Introduction to Theoretical Linguistics*. Cambridge: Cambridge University Press, 1968.

Maratsos, M. P. Children Who Get Worse at Understanding the Passive: a Replication of Bever. *Journal of Psycholinguistic Research*, 1974, 3, 65-74.

Maratsos, M. P., & Abramovitch, R. How Children Understand Full, Truncated, and Anomalous Passives. *Journal of Verbal Learning and Verbal Behavior*, 1975, 14, 145-57.

Martin, E., & Roberts, K. H. Grammatical Factors in Sentence Retention. *Journal of Verbal Learning and Verbal Behavior*, 1966, 5, 211-18.

Martin, E., & Roberts, K. H. Sentence Length and Sentence Retention in the Free-Learning Situation. *Psychonomic Science*, 1967, 8, 535-6.

Martin, E., Roberts, K. H., & Collins, A. M. Short-Term Memory for Sentences. *Journal of Verbal Learning and Verbal Behavior*, 1968, 7, 560-66.

Matthews, W. A. Transformational Complexity and Short Term Recall. *Language and Speech*, 1968, 11, 120-28.

McCawley, J. D. Review of Sebeok, T. A. (Ed.), *Current Trends in Linguistics* (Vol. 3). *Language*, 1968, 44, 556-93.

McCawley, J. D. Where Do Noun Phrases Come From? In Steinberg, D. D., & Jakobovits, L. A. (Eds.), *Semantics: an Interdisciplinary Reader in Philosophy, Linguistics, and Psychology*. Cambridge: Cambridge University Press, 1971.

McCawley, J. D. Review of Derwing, B. L., *Transformational Grammar as a Theory of Language Acquisition*. *Canadian Journal of Linguistics*, 1974, 19, 177-88.

McKerrow, R. B. English Grammar and Grammars. *Essays and Studies*, 1922, 8, 148-67 (Oxford: Oxford University Press).

Mehler, J. Some Effects of Grammatical Transformation on the Recall of English Sentences. *Journal of Verbal Learning and Verbal Behavior*, 1963, 2, 346-51.

Menyuk, P. Syntactic Structures in the Language of Children. *Child Development*, 1963, 34, 407-22.

Michael, I. *English Grammatical Categories and the Tradition to 1800*. Cambridge: Cambridge University Press, 1970.

Miller, G. A. *Language and Communication*. New York: McGraw-Hill, 1951.

Miller, G. A. Communication. *Annual Review of Psychology*, 1954, 5, 401-20.

Miller, G. A. Some Psychological Studies of Grammar. *American Psychologist*, 1962, 17, 748-62.

Miller, G. A. Psycholinguistic Approaches to the Study of Communication. In Arm, D. L. (Ed.), *Journeys in Science*. Albuquerque: University of New Mexico Press, 1967.

Miller, G. A. A Psychological Method to Investigate Verbal Concepts. *Journal of Mathematical Psychology*, 1969, 6, 169-91.

Miller, G. A., & Chomsky, N. Finitary Models of Language Users. In Luce, R. D., Bush, R. R., & Galanter, E. (Eds.), *Handbook of Mathematical Psychology*, Vol. 2. New York: Wiley & Sons, 1963.

Miller, G. A., & McKean, K. O. A Chronometric Study of Some Relations between Sentences. *Quarterly Journal of Experimental Psychology*, 1964, 16, 297-308.

Miller, J. F. Sentence Imitation in Pre-School Children. *Language and Speech*, 1973, 16, 1-14.

Morris, V. A., Rankine, F. C., & Reber, A. S. Sentence Comprehension, Grammatical Transformations, and Response Availability. *Journal of Verbal Learning and Verbal Behavior*, 1968, 7, 1113-15.

Moyne, J. A. The So-Called Passive in Persian. *Foundations of Language*, 1974, 12, 249-67.

Nida, E. A. A Synopsis of English Syntax. Doctoral dissertation, University of Michigan, Ann Arbor, 1943.

Nida, E. A. *A Synopsis of English Syntax*. The Hague: Mouton & Co., 1966.

Noss, R. B. The Ungrounded Transformer. *Language Sciences*, 1972, 23, 8-14.

Olson, D. R., & Filby, N. On the Comprehension of Active and Passive Sentences. Cognitive Psychology, 1972, 3, 361-81.

Osgood, C. E., & Sebeok, T. A. (Eds.). Psycholinguistics: a Survey of Theory and Research Problems. Baltimore: Waverly Press, 1954.

Osgood, C. E., Suci, G. J., & Tannenbaum, P. H. The Measurement of Meaning. Urbana: University of Illinois Press, 1957.

Paivio, A. Abstractness, Imagery, and Meaningfulness in Paired Associate Learning. Journal of Verbal Learning and Verbal Behavior, 1965, 4, 32-38.

Paivio, A. Mental Imagery in Associative Language and Memory. Psychological Review, 1969, 76, 241-63.

Perfetti, C. A. Sentence Retention and the Depth Hypothesis. Journal of Verbal Learning and Verbal Behavior, 1969, 8, 101-4. (a)

Perfetti, C. A. Lexical Density and Phrase Structure Depth as Variables in Sentence Retention. Journal of Verbal Learning and Verbal Behavior, 1969, 8, 719-24. (b)

Postal, P. M. Limitations of Phrase-Structure Grammars. In Fodor, J. A., & Katz, J. J. (Eds.), The Structure of Language. Englewood Cliffs, N.J.: Prentice-Hall, 1964.

Postal, P. M. Cross-over Phenomena. New York: Holt, Rinehart, & Winston, 1971.

Prentice, J. L. Response Strength of Single Words as an Influence in Sentence Behavior. Journal of Verbal Learning and Verbal Behavior, 1966, 5, 429-33.

Prideaux, G. D. On the Notion 'Linguistically Significant Generalization.' Lingua, 1971, 26, 337-47.

Prideaux, G. D. An Information-Structure View of Language. Public lecture, University of Ottawa, March 12, 1975. (MS, University of Alberta)

Prideaux, G. D., & Baker, W. J. An Experimental Investigation of Sentence Relatedness. Lingua, 1974, 34, 101-14.

Quirk, R. Descriptive Statement and Serial Relationship. Language, 1965, 41, 205-17.

Reichling, A. Principles and Methods of Syntax: Cryptanalytical Formalism. *Lingua*, 1961, 10, 1-17.

Reid, J. R. The Aural Discrimination of Basic Sentence Types. Unpublished MSc thesis, University of Alberta, 1972.

Reid, J. R. The Anthropomorphosis of Syntax. *Canadian Journal of Linguistics*, 1974, 19, 18-28. (a)

Reid, J. R. Sentence Type Variables as Aural Concept Formation Dimensions. *Journal of Psycholinguistic Research*, 1974, 3, 233-45. (b)

Reid, J. R. Deep Structure, Surface Structure, and Syntactic Experimentation. Forthcoming. (a)

Reid, J. R. Deep versus Surface Relatedness in English Sentences. Forthcoming. (b)

Reid, J. R. Grammatical Voice and Illocutionary Meaning. Forthcoming. (c)

Roberts, K. H. Grammatical and Associative Constraints in Sentence Retention. *Journal of Verbal Learning and Verbal Behavior*, 1968, 7, 1072-76.

Robson, R. A. On the Generation of Passive Constructions in English (Doctoral dissertation, University of Texas at Austin, 1972). *Dissertation Abstracts International*, 1973, 33, 5155A-56A. (University Microfilms No. 73-7632)

Rohrman, N. L. The Role of Syntactic Structure in the Recall of English Nominalizations. *Journal of Verbal Learning and Verbal Behavior*, 1968, 7, 904-12.

Sachs, J. S. Recognition Memory for Syntactic and Semantic Aspects of Connected Discourse. *Perception and Psychophysics*, 1967, 2, 9, 437-42.

Salzinger, K., & Eckerman, C. Grammar and the Recall of Chains of Verbal Responses. *Journal of Verbal Learning and Verbal Behavior*, 1967, 6, 232-39.

Sapir, E. *Language*. New York: Harcourt, Brace, & World, 1921.

Sapir, E. The Grammarian and his Language. *American Mercury*, 1924, 1, 149-55.

de Saussure, F. [*Course in General Linguistics*] (W. Baskin, transl.). New York: McGraw-Hill, 1966. (originally published, 1915.)

Savin, H. B., & Perchonock, E. Grammatical Structure and the Immediate Recall of English Sentences. *Journal of Verbal Learning and Verbal Behavior*, 1965, 4, 348-53.

Shafto, M. The Space for Case. *Journal of Verbal Learning and Verbal Behavior*, 1973, 12, 551-62.

Singh, S., Brokaw, S. P., & Black, J. W. Effects of Delayed Sidetone, Noise, and Syntactic Structure on the Level and Duration of Speech. *Journal of Verbal Learning and Verbal Behavior*, 1967, 6, 629-33.

Slobin, D. I. Grammatical Transformations and Sentence Comprehension in Childhood and Adulthood. *Journal of Verbal Learning and Verbal Behavior*, 1966, 5, 219-27.

Slobin, D. I. Recall of Full and Truncated Passive Sentences in Connected Discourse. *Journal of Verbal Learning and Verbal Behavior*, 1968, 7, 876-81.

Smith, F. Reversal of Meaning as a Variable in the Transformation of Grammatical Sentences. *Journal of Verbal Learning and Verbal Behavior*, 1965, 4, 39-43.

Steinberg, D. D. Chomsky: from Formalism to Mentalism and Psychological Invalidity. *Glossa*, 1975, 9, 218-252.

Stockwell, R. P., Schachter, P., & Partee, B. H. *The Major Syntactic Structures of English*. New York: Holt, Rinehart, & Winston, 1973.

Stuart, C.I.J.M. On the Empirical Foundations of Linguistic Description. *Actes du Xe congrès international de linguistes* (Bucharest, 1967), 1969, I, 393-99.

Sutherland, R. D. *Language and Lewis Carroll*. The Hague: Mouton & Co., 1970.

Svartvik, J. *On Voice in the English Verb*. The Hague: Mouton & Co., 1966.

Sweet, H. *A New English Grammar, Logical and Historical* (Part I). Oxford: Oxford University Press, 1891.

Tannenbaum, P. H., & Williams, F. Generation of Active and Passive Sentences as a Function of Subject or Object Focus. *Journal of Verbal Learning and Verbal Behavior*, 1968, 7, 246-50. (a)

Tannenbaum, P. H., & Williams, F. Prompted Word Replacement in Active and Passive Sentences. *Language and Speech*, 1968, 11, 220-29. (b)

Taylor, I. Content and Structure in Sentence Production. *Journal of Verbal Learning and Verbal Behavior*, 1969, 8, 170-5.

Turner, E. A., & Rommetveit, R. The Acquisition of Sentence Voice and Reversibility. *Child Development*, 1967, 38, 649-60. (a)

Turner, E. A., & Rommetveit, R. Experimental Manipulation of the Production of Active and Passive Voice in Children. *Language and Speech*, 1967, 10, 169-80. (b)

Turner, E. A., & Rommetveit, R. Focus of Attention in Recall of Active and Passive Sentences. *Journal of Verbal Learning and Verbal Behavior*, 1968, 7, 543-48.

Twaddell, W. F. *The English Verb Auxiliaries* (2nd ed.). Providence: Brown University Press, 1963.

Veldman, D. J. *FORTRAN Programming for the Behavioral Sciences*. New York: Holt, Rinehart, & Winston, 1967.

Wales, R. J., & Marshall, J. C. The Organization of Linguistic Performance. In Lyons, J., & Wales, R. J. (Eds.), *Psycholinguistics Papers*. Edinburgh: Edinburgh University Press, 1966.

Wason, P. C. The Contexts of Plausible Denial. *Journal of Verbal Learning and Verbal Behavior*, 1965, 4, 7-11.

Watt, W. C. On Two Hypotheses Concerning Psycholinguistics. In Hayes, J. R. (Ed.), *Cognition and the Development of Language*. New York: Wiley & Sons, 1970.

Watt, W.C. Mentalism in Linguistics II. *Glossa*, 1974, 8, 3-40.

Wearing, A. J. The Storage of Complex Sentences. *Journal of Verbal Learning and Verbal Behavior*, 1970, 9, 21-29.

Wright, P. Sentence Retention and Transformation Theory. *Quarterly Journal of Experimental Psychology*, 1968, 20, 265-72.

Wright, P. Transformations and the Understanding of Sentences. *Language and Speech*, 1969, 12, 156-66. (a)

Wright, P. Two Studies of the Depth Hypothesis. *British Journal of Psychology*, 1969, 60, 63-69. (b)

Wright, P. Some Observations on how People Answer Questions about Sentences. _Journal of Verbal Learning and Verbal Behavior_, 1972, 11, 188-95.

Yngve, V. A Model and an Hypothesis for Language Structure. _Proceedings of the American Philosophical Society_, 1960, 104, 444-66.

Yngve, V. Implications of Mechanical Translation Research. _Proceedings of the American Philosophical Society_, 1964, 108, 275-81.

APPENDIX A

THE EXPERIMENT 1 STIMULUS SENTENCES

Note: The sentences are grouped according to lexical content sets, in order to make more evident the counterbalancing of NPs and their substitutes with respect to word count, definiteness of determiner, and singularity/plurality of nouns. The number at the end of each sentence indicates the position it occupied in the basic randomized presentation order (see Ch. 3). The rows within sentence groups represent the eight syntactic types, in order, i.e.,

1. (IAO) Imperfective Active with direct Object;
2. (IAB) Imperfective Active with adv. By-phrase;
3. (PAO) Perfective Active with direct Object;
4. (PAB) Perfective Active with adv. By-phrase;
5. (IPO) Imperfective Passive with Other adv. phrase;
6. (IPB) Imperfective Passive with agentive By-phrase;
7. (PPO) Perfective Passive with Other adv. phrase;
8. (PPB) Perfective Passive with agentive By-phrase.

Several strikers picketed the post office. (60)
Several strikers picketed by the entrance. (99)
Several strikers have picketed the post office. (76)
Several strikers have picketed by the entrance. (87)
The post office was picketed on union orders. (15)
The post office was picketed by several strikers. (18)
The post office has been picketed on union orders. (125)
The post office has been picketed by several strikers. (46)

The governor answered my urgent appeal. (49)
The governor answered by return telegram. (109)
The governor has answered my urgent appeal. (72)
The governor has answered by return telegram. (95)
My urgent appeal was answered within an hour. (2)
My urgent appeal was answered by the governor. (29)
My urgent appeal has been answered within an hour. (117)
My urgent appeal has been answered by the governor. (40)

These ladies knitted some warm woollen socks. (44)
These ladies knitted by the cosy fireside. (61)
These ladies have knitted some warm woollen socks. (98)
These ladies have knitted by the cosy fireside. (67)
Some warm woollen socks were knitted for the bazaar. (86)
Some warm woollen socks were knitted by these ladies. (6)
Some warm woollen socks have been knitted for the bazaar. (19)
Some warm woollen socks have been knitted by these ladies.
(123)

That rookie scored the last two goals. (37)
That rookie scored by sheer good luck. (55)
That rookie has scored the last two goals. (107)
That rookie has scored by sheer good luck. (73)
The last two goals were scored with no assist. (91)
The last two goals were scored by that rookie. (14)
The last two goals have been scored with no assist. (31)
The last two goals have been scored by that rookie. (116)

Some clever rustlers stole our cattle. (115)
Some clever rustlers stole by moonlight. (41)
Some clever rustlers have stolen our cattle. (63)
Some clever rustlers have stolen by moonlight. (104)
Our cattle were stolen off the south pasture. (75)
Our cattle were stolen by some clever rustlers. (93)
Our cattle have been stolen off the south pasture. (5)
Our cattle have been stolen by some clever rustlers. (23)

The amateur artist painted some landscapes. (128)
The amateur artist painted by number. (33)
The amateur artist has painted some landscapes. (54)
The amateur artist has painted by number. (111)
Some landscapes were painted at the hobby show. (68)
Some landscapes were painted by the amateur artist. (84)
Some landscapes have been painted at the hobby show. (10)
Some landscapes have been painted by the amateur artist. (28)

The hungry children ate our picnic lunch. (26)
The hungry children ate by that fountain. (126)
The hungry children have eaten our picnic lunch. (36)
The hungry children have eaten by that fountain. (52)
Our picnic lunch was eaten after the softball game. (106)
Our picnic lunch was eaten by the hungry children. (70)
Our picnic lunch has been eaten after the softball game. (96)
Our picnic lunch has been eaten by the hungry children. (11)

The ground controllers steered those unmanned airplanes. (22)
The ground controllers steered by radar contact. (120)
The ground controllers have steered those unmanned airplanes. (42)
The ground controllers have steered by radar contact. (64)
Those unmanned airplanes were steered from the control center. (101)
Those unmanned airplanes were steered by the ground controllers. (74)
Those unmanned airplanes have been steered from the control center. (81)
Those unmanned airplanes have been steered by the ground controllers. (3)

Some band members rehearsed a difficult new march. (12)
Some band members rehearsed by the parking lot. (30)
Some band members have rehearsed a difficult new march. (119)
Some band members have rehearsed by the parking lot. (48)
A difficult new march was rehearsed before the big parade. (51)
A difficult new march was rehearsed by some band members. (112)
A difficult new march has been rehearsed before the big parade. (69)
A difficult new march has been rehearsed by some band members. (94)

A large crowd applauded the three tired astronauts. (4)
A large crowd applauded by the airport exit. (20)
A large crowd has applauded the three tired astronauts. (127)
A large crowd has applauded by the airport exit. (39)
The three tired astronauts were applauded on their safe return. (58)
The three tired astronauts were applauded by a large crowd. (97)
The three tired astronauts have been applauded on their safe return. (77)
The three tired astronauts have been applauded by a large crowd. (88)

A stern military dictator governed the country. (89)
A stern military dictator governed by decree. (16)
A stern military dictator has governed the country. (27)
A stern military dictator has governed by decree. (121)
The country was governed in a most undemocratic way. (38)
The country was governed by a stern military dictator. (53)
The country has been governed in a most undemocratic way. (110)
The country has been governed by a stern military dictator. (80)

An old wandering minstrel strummed a serenade. (85)
An old wandering minstrel strummed by ear. (7)
An old wandering minstrel has strummed a serenade. (17)
An old wandering minstrel has strummed by ear. (114)
A serenade was strummed in the opera's third act. (47)
A serenade was strummed by an old wandering minstrel. (62)
A serenade has been strummed in the opera's third act. (100)
A serenade has been strummed by an old wandering minstrel. (65)

Several retired film stars performed the minor roles. (79)
Several retired film stars performed by special arrangement. (82)
Several retired film stars have performed the minor roles. (13)
Several retired film stars have performed by special arrangement. (21)

The minor roles were performed with very little stage makeup. (113)
The minor roles were performed by several retired film stars. (35)
The minor roles have been performed with very little stage makeup. (59)
The minor roles have been performed by several retired film stars. (108)

A blind gypsy woman sang some romantic ballads. (66)
A blind gypsy woman sang by the campfire. (92)
A blind gypsy woman has sung some romantic ballads. (8)
A blind gypsy woman has sung by the campfire. (25)
Some romantic ballads were sung at the old folks' request. (124)
Some romantic ballads were sung by a blind gypsy woman. (43)
Some romantic ballads have been sung at the old folks' request. (56)
Some romantic ballads have been sung by a blind gypsy woman. (103)

The school board members approved a new salary schedule. (102)
The school board members approved by unanimous voice vote. (71)
The school board members have approved a new salary schedule. (83)
The school board members have approved by unanimous voice vote. (1)
A new salary schedule was approved at the last regular meeting. (32)
A new salary schedule was approved by the school board members. (118)
A new salary schedule has been approved at the last regular meeting. (45)
A new salary schedule has been approved by the school board members. (50)

That rich young heiress drove a bright red Ferrari. (105)
That rich young heiress drove by the judges' stand. (78)
That rich young heiress has driven a bright red Ferrari. (90)
That rich young heiress has driven by the judges' stand. (9)
A bright red Ferrari was driven around the oval race track. (24)
A bright red Ferrari was driven by that rich young heiress. (122)
A bright red Ferrari has been driven around the oval race track. (34)
A bright red Ferrari has been driven by that rich young heiress. (57)

APPENDIX B

EXPERIMENT 1 INSTRUCTIONS TO SUBJECTS

Note: These instructions were printed on computer terminals in upper case italics, using an IBM 988 (APL) typing element. Rows of dots indicate entry points for the subjects' responses.

THANK YOU FOR VOLUNTEERING TO TAKE PART IN THIS RESEARCH.

PLEASE TYPE YOUR NAME, SURNAME FIRST, THEN TOUCH THE RETURN KEY.

. . .

HOW OLD ARE YOU? (NEAREST BIRTHDAY)

. . .

HOW MANY SCHOOL GRADES OR YEARS HAVE YOU COMPLETED ALTOGETHER?

. . .

THIS PROCEDURE IS NOT A TEST OF YOUR INTELLIGENCE OR SKILL.

THE PURPOSE OF THIS RESEARCH IS TO DISCOVER, IN AN OBJECTIVE, SCIENTIFIC MANNER, WHAT FEATURES OF SENTENCES ARE MOST NOTICEABLE TO ORDINARY SPEAKERS OF ENGLISH. IF YOU HAVE ANY QUALMS AT ALL ABOUT CONTINUING WITH THIS EXPERIMENT, PLEASE TELL THE EXPERIMENTER NOW, AND HE WILL STOP THE PROGRAM.

TOUCH THE RETURN IF YOU WISH TO GO ON WITH YOUR INSTRUCTIONS.

. . .

IN THIS EXPERIMENT, YOU WILL SEE A LARGE NUMBER OF DIFFERENT ENGLISH SENTENCES. SOME OF THEM MAY SEEM A LITTLE ODD, OUT OF CONVERSATIONAL CONTEXT, BUT PAY NO ATTENTION TO THAT. WHAT THE SENTENCES SAY IS NOT IMPORTANT; WHAT IS IMPORTANT IS HOW THEY SAY IT.

IN THESE SENTENCES, THE SAME FEW TOPICS ARE USED OVER AND OVER. DO NOT LET THIS CONFUSE YOU, EITHER, BECAUSE NO TWO SENTENCES ARE EXACTLY ALIKE. AGAIN, IT'S NOT WHAT THE SENTENCES SAY, BUT HOW THEY SAY IT, THAT IS IMPORTANT.

SENTENCES CAN BE ABOUT DIFFERENT TOPICS, AND YET BE VERY SIMILAR IN HOW THEY ARE EXPRESSED. FOR EXAMPLE,

THE CHEESE WASN'T EATEN BY MICE.
AND
SNOWBALLS WEREN'T THROWN BY MANY CHILDREN.

SAY ENTIRELY DIFFERENT THINGS, YET THEY ARE IN MANY WAYS BOTH THE SAME TYPE OF STATEMENT. CAN YOU SEE THE SIMILARITIES? (TYPE YES OR NO, THEN TOUCH RETURN)

. . .

ON THE OTHER HAND, SENTENCES LIKE

THIEVES HAVE BROKEN INTO OUR HOUSE.
AND
OUR HOUSE HAS BEEN BROKEN INTO BY THIEVES.

SAY VERY NEARLY THE SAME THING, BUT NOT IN QUITE THE SAME WAY. THESE SENTENCES COULD THEREFORE BE CLASSIFIED AS DIFFERENT TYPES. CAN YOU SEE THE DIFFERENCES?

. . .

YOUR TASK IN THIS EXPERIMENT IS TO LEARN TO RECOGNIZE ONE CERTAIN TYPE OF SENTENCE AMONG ALL THE DIFFERENT TYPES YOU WILL SEE. THE SENTENCES WILL BE PRESENTED ONE AT A TIME, IN A MIXED-UP ORDER. IF YOU THINK A SENTENCE IS ONE OF YOUR TARGET-TYPE SENTENCES, ENTER A 'YES' RESPONSE; IF YOU THINK IT IS NOT A TARGET SENTENCE, OR IF YOU DON'T KNOW, ENTER A 'NO' RESPONSE.

EACH TIME YOU RESPOND, THE COMPUTER WILL TELL YOU IF YOUR GUESS WAS CORRECT OR WRONG. USE THIS INFORMATION TO FIGURE OUT WHAT YOUR TARGET TYPE IS, BUT DO NOT LOOK BACK AT YOUR PREVIOUS RESPONSES. WHEN YOU HAVE MADE ENOUGH CORRECT RESPONSES IN A ROW, THE COMPUTER WILL TERMINATE THE EXPERIMENT.

AT FIRST, YOU WILL HAVE NO IDEA AT ALL WHAT YOUR TARGET TYPE IS, SO RESPOND 'NO' TO THE FIRST FEW SENTENCES YOU SEE. WHEN YOU RESPOND 'NO' AND THE COMPUTER REPLIES 'CORRECT', THAT MEANS YOU HAVE CORRECTLY REJECTED A NON-TARGET SENTENCE. BUT WHEN YOU RESPOND 'NO' AND THE COMPUTER SAYS 'WRONG', STUDY THAT LAST SENTENCE, BECAUSE IT WAS ONE OF YOUR TARGET SENTENCES, AND YOU SHOULD HAVE RESPONDED 'YES' TO IT.

IF THERE IS ANYTHING YOU DON'T UNDERSTAND, PLEASE ASK THE EXPERIMENTER.

TOUCH THE RETURN WHEN YOU ARE READY TO GO ON.

. . .

THE EXPERIMENT WILL NOW BEGIN. AFTER EACH SENTENCE HAS BEEN PRESENTED, TYPE A 'Y' IF YOU THINK IT IS ONE OF YOUR TARGET-TYPE SENTENCES; TYPE AN 'N' IF YOU THINK IT IS NOT, OR IF YOU DON'T KNOW, AS IN THE FIRST FEW INSTANCES.

IF YOU MAKE A TYPING ERROR, CALL THE EXPERIMENTER.

DO NOT LOOK BACK AT YOUR PREVIOUS RESPONSES, EXCEPT FOR THOSE YOU CAN'T HELP SEEING.

APPENDIX C

THE EXPERIMENT 2 STIMULUS SENTENCES

Note: The sentences are grouped here according to length of subject NP (two, three, or four words), its definiteness, its singularity/plurality, and its animateness. Successive sentences within a group represent the five types of *be* complementation under investigation, namely:

1. NP was/were (Det) N Prep NP
2. NP was/were ADJ Prep NP
3. NP was/were agentive *V+ed* *by* agent NP
4. NP was/were agentive *V+ed* Prep non-agent NP
5. NP was/were statal *V+ed* Prep non-agent NP

In the experiment, sentences were printed (and punched) all in capitals on blank 80-column computer cards; the number at the end of each sentence below indicates the position it occupied in the basic randomized presentation order.

A guitarist was the leader of the group. (11)
A clown was available for the birthday party. (58)
A student was expelled by the principal. (99)
A violinist was introduced to the conductor. (86)
A crowd was gathered around the entrance. (36)

A symphony was the highlight of the concert. (106)
A landscape was ideal for the clubhouse wall. (47)
A story was submitted by a well-known author. (54)
A sonata was played on the antique piano. (67)
A hurricane was headed for Miami. (89)

Several teachers were members of the council. (45)
Several strikers were insistent in their demands. (110)
Several suspects were arrested by the police. (33)
Several people were trampled in the riot. (118)
Several participants were tired of the routine. (119)

Some tests were a strain on students' nerves. (113)
Some products were inferior in quality. (93)
Some suggestions were ignored by the authorities. (101)
Some cars were transported to Chicago. (10)
Some sheets were frayed at the edges. (4)

The deceased was a friend of the family. (59)
The salesman was sincere in his approach. (69)
The ambassador was accompanied by a guardsman. (62)
The senator was assaulted during the rally. (108)
The scientist was devoted to his research. (48)

The nation was a model of democracy. (9)
The area was rich in natural resources. (22)
The province was governed by a parliamentary majority. (112)
The country was admitted to the United Nations. (71)
The island was situated in the Mediterranean. (75)

These girls were the hostesses for our party. (102)
Those witnesses were ignorant of the true facts. (12)
Those divers were assisted by a deckhand. (2)
These musicians were auditioned for the orchestra. (91)
These ladies were refined in their behavior. (44)

Those sculptures were the work of a creative person. (5)
Those textbooks were essential for the course. (115)
These paintings were donated by a wealthy widow. (87)
These towers were erected in the nineteenth century. (37)
Those proposals were doomed from the start. (8)

A reckless idiot was the driver of the vehicle. (65)
A visiting clergyman was present for the ceremony. (105)
A recent graduate was interviewed by the dean. (13)
A French chef was hired for the banquet. (56)
A certain miser was reputed to be rich. (80)

A one-act comedy was the entertainment for the evening. (32)
A bachelor apartment was vacant in our building. (3)
A bigger computer was ordered by the management. (92)
A long petition was presented to the mayor. (42)
A station wagon was suited to our needs. (104)

Many federal politicians were a discredit to their party. (120)
Many club members were behind in their dues. (43)
Many radical priests were denounced by the Pope. (107)
Many prominent lawyers were appointed to the commission. (35)
Many previous offenders were addicted to heroin. (60)

Many forest fires were the result of carelessness. (90)
Many office buildings were grimy from air pollution. (85)
Many hidden talents were discovered by the assistant coach. (6)
Many violin solos were included in the program. (23)
Many insurance claims were related to the accident. (66)

The team captain was high scorer of the season. (94)
The fat gentleman was uncomfortable on the bus. (74)
The escaped convict was recaptured by the sheriff. (46)
The goal tender was injured during the playoffs. (52)
The young magician was accustomed to large audiences. (114)

Our bedroom furniture was a gift from my in-laws. (21)
Our hall closet was full of winter coats. (77)
Our picnic basket was carried by the oldest child. (26)
Our wall safe was robbed during our absence. (82)
Our linen tablecloth was lined with plastic. (34)

My distant cousins were experts in cattle breeding. (39)
My fellow conspirators were aware of the danger. (17)
My summer employers were investigated by the Mounties. (24)
My college classmates were invited to the wedding. (78)
My sister's girlfriends were clothed in faded denim. (95)

Those faulty mufflers were the cause of all the racket. (49)
Those soaring gliders were graceful in their flight. (53)
Those model airplanes were designed by their builders. (79)
Those miniature rockets were controlled from the ground. (61)
Those racing boats were streamlined in appearance. (109)

A junior cabinet minister was the speaker at our meeting. (51)
A senior military officer was responsible for national security. (98)
A popular bilingual candidate was nominated by the Liberals. (41)
A former state governor was elected to the presidency. (103)
An elderly hospital patient was engaged in useful therapy. (15)

A bright red Ferrari was the car of his dreams. (96)
A shiny new Cadillac was conspicuous in the showroom. (27)
A complete stereo system was installed by a technician. (72)
A smashed red convertible was consigned to the scrap heap. (50)
A green panel truck was involved in last night's robbery. (20)

Several school board members were businessmen of the community. (16)
Several Olympic gold medalists were present in the audience. (117)
Several retired film stars were honored by the Academy. (68)
Several Australian tennis players were provided with accommodation. (28)
Several Hollywood beauty queens were renowned for their complexions. (84)

Some heavy woollen blankets were a requirement for the trip. (70)
Some extra canned rations were necessary for emergencies. (63)
Some warm sleeveless sweaters were knitted by our wives. (38)
Some clean white shirts were delivered from the laundry. (14)
Some nylon fishing lines were entangled in the weeds. (55)

The busy rock collector was a student of geology. (81)
The noted brain surgeon was famous for his technique. (7)
The new heavyweight champion was congratulated by his admirers. (116)
The lone bank robber was pursued across Nevada. (97)
The amateur folk singer was endowed with natural talent. (64)

The finance committee's survey was one item on the agenda. (29)
The Supreme Court's decision was relevant to civil rights. (40)
The improved hiring policy was proposed by the staff association. (18)
The new salary schedule was approved at the last board meeting. (1)
The company representative's report was biased in their favor. (100)

The three returning astronauts were the heroes of the space program. (73)
The youthful mountain climbers were proud of their accomplishment. (31)
The few surviving crewmen were questioned by reporters. (57)
The Prime Minister's children were escorted to the plane. (111)
The nation's labor unions were opposed to higher taxes. (30)

The cathedral's twin spires were a landmark of the city. (76)
The proposed tax cuts were inportant to his constituents. (88)
The rickety old tenements were condemned by the building inspector. (83)
The student council's complaints were dismissed as a nuisance. (19)
The west coast beaches were deserted in the winter. (25)

APPENDIX D

EXPERIMENT 2 INSTRUCTIONS TO SUBJECTS

Note: These instructions were read orally to all subjects in Experiment 2. The rows of dots indicate time lapses for answering subjects' questions and for performance of the tasks.

"The deck of computer cards in front of you contains a large number of simple English sentences, one on each card. No two of the sentences are exactly alike, but many of them are very similar to each other in certain ways. The purpose of this research is to find out which characteristics of sentences are most important for communicating in English.

Before we begin, I would like you to get an idea of the different kinds of sentences there are, here, in the deck. The sentence cards are on the table, face down. When I say 'Go,' please turn the cards face up, one at a time; read each sentence once, quickly, to yourself, then place the card face down in a second pile. As you go through the deck in this way, some of the sentences may strike you as strange, in their wording. This is because the sentences are not meaningfully connected with each other, and do not form part of a normal conversation; any sentence can sound strange, when it is not being used in the appropriate circumstances. Please try to ignore these slight oddities, and concentrate instead on the different kinds of sentences there are, in the deck. Do you understand? . . .

Go. . . .

As you probably noticed, many of these sentences begin with the same word. That is to say, many of them are statements about similar subjects. This research, however, is not concerned so much with what people talk about as it is with how people express their thoughts about things; therefore, please try to ignore the specific topic of each sentence, and concentrate instead on the different kinds of sentences there are, in the set.

For example, if I were to say to you:

1. George ate bananas this morning.

I would be expressing to you a certain fact about George, namely that he performed a certain act (he ate) on a certain object (bananas) at a certain time (this morning). Do you understand? . . .

Then, if I said to you:

2. George ordered fried chicken yesterday.

or

3. My father bought a new car last week.

I would be giving you information which is different in detail from the information in the first example -- different subjects, different actions, different objects, different times -- but I would not be expressing a different kind of thought: I would still be telling you what someone did (George ate; George ordered; my father bought), to what object he (or she or they) did it (bananas; fried chicken; a new car), and when (this morning; yesterday; last week). Do you understand? . . .

Now, on the other hand, if I were to say to you:

4. George ate heartily this morning.

or

5. The boys dived eagerly into the water.

I would not be telling you quite the same kind of information as before, because I would no longer be telling you what object(s) a certain action was done to, or when, but I would be telling you how an action was performed (heartily; eagerly), and, in the last case, where (into the water). Do you see the subtle difference between these two types of sentences? . . .

As you were reading the sentences on the cards, you may have formed some ideas about the different kinds of statements there are, in the deck. These sentence patterns are not the same, of course, as the examples I have just given you, but the kinds of differences I want you to look for are similar. That is, do not look merely for differences in detail as to who, what, when, where, and so forth, but look for important differences in the kind of information that is being expressed. Try to ignore the subject that is being talked about, in each case; pay attention, rather, to the kind of thing that is being said about it.

Your task will be to sort out all of these sentences into piles, one pile for each of the different kinds of statement, as you perceive them. But you are not to perform this task all at once: in order that I may get an idea of which expressive differences are most meaningful to speakers of English, I will ask you to sort the sentences out in three stages.

First, you will be asked to divide the whole set of sentences into two main groups, according to what strikes you as the most important difference between them. Then, you will be asked to divide those two groups into two smaller groups each, again and again, until the most important sentence types are all in separate piles. While you are sorting sentences out, you may, of course, rearrange them on the table as you see fit; but once you have finished separating a group into two smaller groups, you will not be allowed to put those piles back together again, so be sure they are definitely different in kind before you separate them. Do you understand? . . .

Now, I would like you to divide the whole sentence set into two main groups, so that all the sentences in one pile are similar to each other in their thought pattern, but different in thought pattern from the sentences in the other pile. Do not be concerned, at this point, with some of the little differences in detail you noticed among the sentences; you may take those differences into account later on, when you subdivide the main sentence types. All I want you to do right now is to divide the entire sentence set into two main groups, with those sentences which belong roughly to the same thought pattern in the same pile, and with those sentences which belong to a different thought pattern together in the other pile.

The two piles of sentence cards do not need to be equal; you may put as many or as few sentences into each pile as you wish. It is important, however, that you be consistent, and that you sort all of the sentences out according to the same plan. Use whatever criterion you wish, to separate them, but be sure to separate the sentences on the basis of what you consider to be the main difference between them. Do you understand? . . .

Go. . . .

Now, I would like you to subdivide these two sentence groups into two smaller groups each, so that those sentences which are not completely alike in kind are put into separate piles. All of the sentences in each group have something in common, because you just put them together this way; but no two sentences are exactly alike, so there must be something different about them, as well. Please separate the sentences of each group according to what you think is now the main difference between them. This difference might not be the same for the sentences in Group 1 as for the sentences in Group 2; you will have to decide for yourself what the main subtypes are, in each group, and divide each group accordingly.

Once again, you may put as many or as few sentences into each of the smaller piles as you wish, as long as you separate the sentences of each group consistently, according to the same plan. Please remember that it's not what the sentences talk about that is important, but rather, the kind of information that is being expressed about the subject. Do you understand? . . .

Go. . . .

And now, I would like you to re-examine each of these (four) subgroups of sentences, and see if you can subdivide them one step further. You may, or you may not, consider the sentences in a subgroup to be very different in kind from each other now, but please go through each subgroup once more, before you make your decision. Keep in mind that we are mainly concerned with types of messages, and not with specific message content. If it seems to you that one of these (four) subgroups still contains two distinguishable subtypes of sentence, as far as thought pattern is concerned, please separate it into two smaller piles. If not, leave that subgroup intact, and go on with the next one.

Once again, the new piles you make do not need to be equal, and the criterion for splitting a group is whatever you consider to be the most important thought-pattern difference in that group, if any. This difference might vary, from one group to another, but once you have decided to split a group, please use the same sorting criterion for all the sentences in that group. Do you understand? . . .

Go. . . .

If there are any further subdivisions of sentence groups that you think should be made, on the basis of message type, I would like you to make them now. It is possible, of course, to keep on sorting until you have 120 piles of one sentence each, because the sentences are all different in some way; but it will not be necessary to go that far. Please do not go through the sentence groups again, but if you remember one or two that still contain sentences that are different in some important way, please separate those into two smaller piles each. If not, that will be all. Thank you for your help."

APPENDIX E

HIERARCHICAL CLUSTER ANALYSIS
OF EXPERIMENT 2 DATA, DIAMETER METHOD

Note: The cluster analysis shown below and on the next three pages was produced by a computer program described by S. C. Johnson (1967). The 'diameter' or 'maximum' method of computation tends to yield highly interpretable, compact clusters, emphasizing whatever hierarchical structure is inherent in the similarity data. The sentence identification codes are explained below.

```
Sentence    Main                Degree of Dissimilarity
 Code[1]  Predicate          0    5   10   15   20   25   30

2IPI4 were transported       ---)
4IPI4 were delivered         ---)-)
3DPI4 were controlled        -----))
4IPI5 were entangled         ------))
2IPA4 were trampled          -)     )---)
4DPA4 were escorted          -)-----)   )
                                        )--)
2DPA4 were auditioned        --)        )  )
3DPA4 were invited           --)--)     )  )
3IPA4 were appointed         --)  )     )  )
4IPA4 were provided with     --)--))----)  )
3DPA5 were clothed           ------)       )
                                           )---------)
2DPI4 were erected           -)            )         )
4DPI5 were deserted          -))           )         )
3IPI4 were included          --))          )         )
4DPA5 were opposed           -) )----------)         )
4DPI4 were dismissed         -)-)                    )
                                                     )
                                                     )--)
3IPA3 were denounced         --)                     )  )
4IPA3 were honored           --)--)                  )  )
3DPA3 were investigated      --)  )---)              )  )
4DPA3 were questioned        --)--)   )-----)        )  )
2IPA3 were arrested          --)      )     )        )  )
2DPA3 were assisted          --)------)     )        )  )
                                            )--------)  )
3DPI3 were designed          --)            )           )
4IPI3 were knitted           --))--)        )           )
3IPI3 were discovered        ---)  )        )           )
2DPI3 were donated           --)   ))-------)           )
4DPI3 were condemned         --)---))                   )
2IPI3 were ignored           -------)                   )
```

```
                                                       )
                                                       )
                                                       )
                                                       )
                                                       )
2IPA2 were insistent        ---)                       )
2IPA5 were tired            ---)--)                    )
2DPA2 were ignorant         --)   )--)                 )
2DPI5 were doomed           --))--)  )                 )
2DPA5 were refined          ---)     )                 )
                                     )-----)           )
3DPA2 were aware            -)       )     )           )
4DPA2 were proud            -)-)-----)     )           )
3IPA2 were behind           ---)           )           )
                                           )--------)  )
2IPA1 were members          ---)           )        )  )
4IPA1 were businessmen      ---))---)      )        )  )
2DPA1 were the hostesses    ----)   )      )        )  )
3DPA1 were experts          --)     ))     )        )  )
4DPA1 were the heroes       --))----))     )        )  )
3IPA1 were a discredit      ---)     )     )        )  )
                                     )-----)        )  )
3IPA5 were addicted         -)       )              )  )
4IPA5 were renowned         -))------)              )  )
4IPA2 were present          --)                     )  )
                                                    )  )
                                                    )--)
2IPI2 were inferior         --)                     )
3IPI2 were grimy            --)-)--)                )
2IPI5 were frayed           ----)  )                )
3IPI5 were related          --)    )---)            )
4IPI2 were necessary        --)----)   )            )
                                       )---)        )
3DPI2 were graceful         --)        )   )        )
3DPI5 were streamlined      --))       )   )        )
2DPI2 were essential        ---))------)   )        )
4DPI2 were important        ----)          )        )
                                           )--------)
4IPI1 were a requirement    --)            )
4DPI1 were a landmark       --)--)         )
2DPI1 were the work         -)   )--)      )
3DPI1 were the cause        -)---)  )------)
2IPI1 were a strain         -)      )
3IPI1 were the result       -)------)
```

```
2DSA4 was assaulted         ---)
4DSA4 was pursued           ---))-----)
4ISA4 was elected           ----)     )
                                      )----)
3ISA3 was interviewed       ---)      )    )
3DSA3 was recaptured        ---)-)    )    )
2ISA3 was expelled          -----))---)    )
4ISA3 was nominated         ------)        )
                                           )-----)
3ISA4 was hired             --)            )     )
3DSA4 was injured           --))           )     )
2ISA4 was introduced        ---))----------)     )
2DSA3 was accompanied       ----)                )
                                                 )------)
3DSI3 was carried           --)                  )      )
4ISI3 was installed         --)-)                )      )
3ISI3 was ordered           ----))               )      )
2ISI3 was submitted         -----))-)            )      )
2DSI3 was governed          ------) )            )      )
4DSI3 was proposed          -)      ))-----------)      )
4DSI4 was approved          -)------))                  )
4DSA3 was congratulated     ---------)                  )
                                                        )
                                                        )--)
3DSI4 was robbed            --)                         )  )
4ISI4 was consigned         --))                        )  )
3DSI5 was lined             ---)----)                   )  )
2ISI4 was played            --)     )-)                 )  )
3ISI4 was presented         --)-)---) )                 )  )
2DSI4 was admitted          ----)     )                 )  )
                                      )-----------------)  )
4ISA5 was engaged           -)        )                    )
4ISI5 was involved          -)-)      )                    )
2ISA5 was gathered          -) )------)                    )
2ISI5 was headed            -)-)                           )
                                                           )
                                                           )
                                                           )
                                                           )
                                                           )
                                                           )
                                                           )
                                                           )
                                                           )
                                                           )
3ISI2 was vacant            --)                            )
3DSI2 was full              --)-)--)                       )
2ISI2 was ideal             ----)  )                       )
2DSI2 was rich              --)    )-)                     )
2DSI5 was situated          --)----) )---------)           )
3ISI5 was suited            -)       )         )           )
4ISI2 was conspicuous       -)-------)         )           )
                                               )           )
2ISA2 was available         --)                )           )
2DSA2 was sincere           --)--)             )           )
3DSA2 was uncomfortable     -)   )-)           )----)      )
4DSA2 was famous            -)---) )-----)     )    )      )
3ISA2 was present           -)     )     )     )    )      )
4ISA2 was responsible       -)-----)     )     )    )      )
                                         )-----)    )      )
4DSI2 was relevant          --)          )          )      )
4DSI5 was biased            --)---)      )          )      )
                                  )      )          )      )
3DSA5 was accustomed        --)   )------)          )      )
4DSA5 was endowed           --)-) )                 )      )
2DSA5 was devoted           -)  )-)                 )------)
3ISA5 was reputed           -)--)                   )
                                                    )
                                                    )
2ISA1 was the leader        --)                     )
2DSA1 was a friend          --)-----)               )
3ISA1 was the driver        --)     ))------)       )
3DSA1 was high scorer       --)-)---))      )       )
4DSA1 was a student         ----)    )      )       )
4ISA1 was the speaker       ---------)      )       )
                                            )-------)
2ISI1 was the highlight     --)             )
2DSI1 was a model           --)-----)       )
3ISI1 was the entertainment --)     )-------)
4DSI1 was one item          --)--)  )
3DSI1 was a gift            --)  )--)
4ISI1 was the car           --)--)
```

---

[1] 2, 3, or 4 = number of words in subject NP;
D or I = definite or indefinite subject determiner;
S or P = singular or plural subject noun;
A or I = animate or inanimate subject noun;
1, 2, 3, 4, or 5 = type of predicate phrase (see Appendix C).

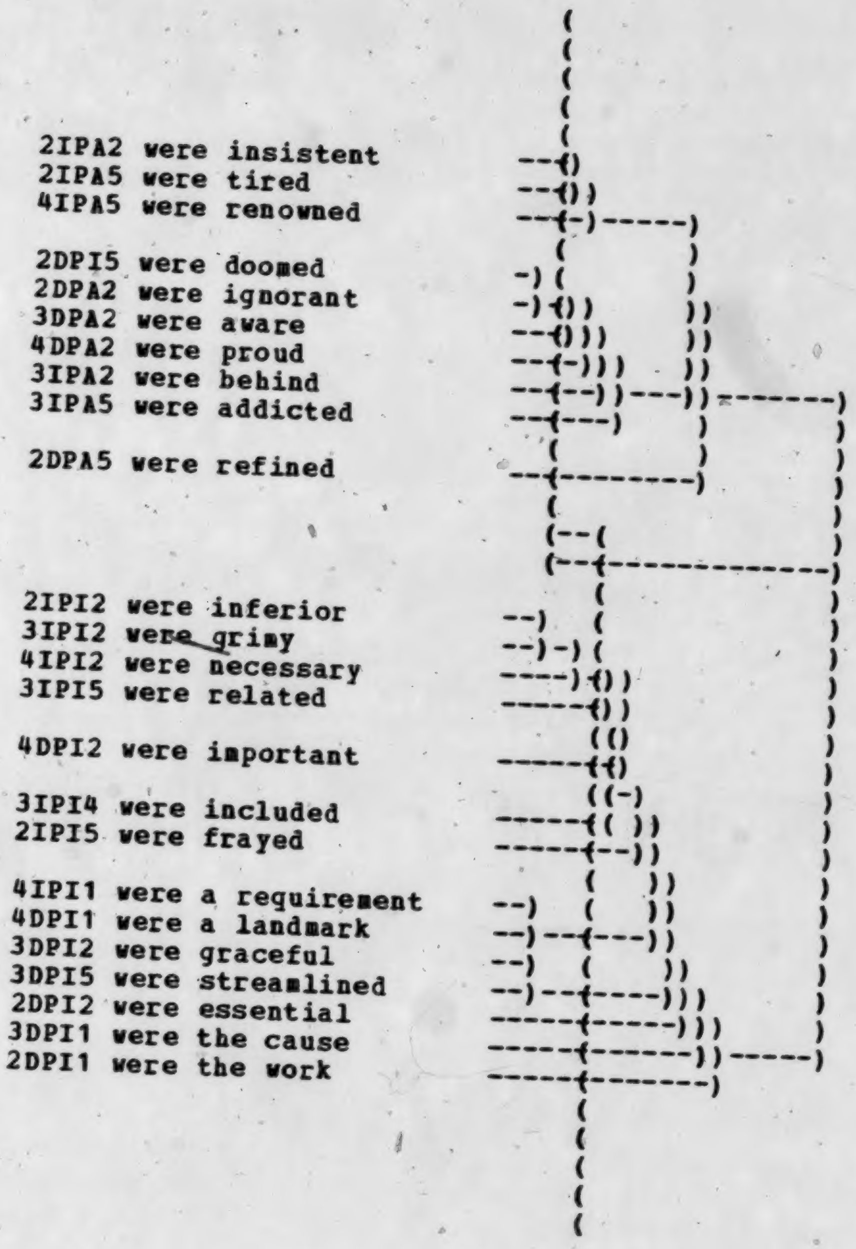
APPENDIX F

HIERARCHICAL CLUSTER ANALYSIS OF EXPERIMENT 2 DATA, CONNECTEDNESS METHOD

Note: The cluster analysis shown below and on the next four pages was produced by a computer program described by S. C. Johnson (1967). The 'connectedness' or 'minimum' method of computation tends to yield less interpretable, chain-like clusters, emphasizing inter-cluster similarity relations, as well as the hierarchical structure which is inherent in the data. The sentence identification codes are explained above, in Appendix E.

```
Sentence     Main                 Degree of Dissimilarity
  Code    Predicate           0    5   10   15   20   25   30

 4IPI4 were delivered          ---)
 2IPI4 were transported        ---))
 4IPI3 were knitted            ----)-)
 3DPI4 were controlled         ------))
 3DPI3 were designed           -------))-------)
 4IPI5 were entangled          --------)       )
                                               )
 3IPA3 were denounced          --)             )
 4IPA3 were honored            --)------)      )---)
 3DPA3 were investigated       --)      )      )   )
 4DPA3 were questioned         --)---)  ))     )   )
 2DPA3 were assisted           --)   )--))     )   )
 2IPA3 were arrested           --))--)   ))    )   )
 2DPI3 were donated            ---)      ))----)   )
 4DPI3 were condemned          ----------))        )
 3IPI3 were discovered         -----------)        ))
                                                   ))
                                                   ))
 2DPA4 were auditioned         --)                 ))
 3DPA4 were invited            --))                ))
 3IPA4 were appointed          ---)-)--------------))
 4IPA4 were provided with      -----)               )
                                             (------)
 2DPI4 were erected            --------------(------)
                                             (
                                             (
                                             (
                                             (
                                             (
                                          (
                                          (
                                          (
                                          (
                                          (
2DSA4 was assaulted         ---)          (
4DSA4 was pursued           ---)-)---)    (
3DSA4 was injured           -----)   )    (
                                     )--) (
3ISA3 was interviewed       ---)     )  ) (
3DSA3 was recaptured        ---)-)---)  ) (
2ISA3 was expelled          -----)      ) (
                                        ))(
3DSI3 was carried           --)         ))(
4ISI3 was installed         --)-)-------))(
3ISI3 was ordered           ----)        )(-)
                                         )( )
3ISA4 was hired             -------------)( )-)
                                          ( ) )
2DSA3 was accompanied       --------------(-) )
                                          (   ))
3DSI4 was robbed            --)           (   ))
4ISI4 was consigned         --)-)---------(---))
3ISI4 was presented         ----)         (    ))
                                          (    ))
4ISA3 was nominated         --------------(----))
                                          (     ))
2ISI4 was played            --------------(-----))
                                          (      ))
2DSI4 was admitted          --------------(------))
                                          (       ))
3DSI5 was lined             --------------(-------))
                                          (        ))
2ISA4 was introduced        --------------(--------))
                                          (         ))
4ISA4 was elected           --------------(---------))
                                          (          ))
2ISI5 was headed            --------------(----------))
                                          (           ))
4DSI3 was proposed          --------------(-----------))
                                          (            ))
4DPA4 were escorted         --------------(------------))
                                          (             ))
2ISI3 was submitted         --------------(-------------))
                                          (              )
4ISA5 was engaged           -)            (          (---)
4ISI5 was involved          -)------------(----------(---)
                                          (          (
                                          (          (
                                          (          (
                                          (          (
                                          (          (
                                            (          (
                                            (          (
                                            (          (
                                            (          (
                                            (          (
 3ISI2 was vacant             --)           (          (
 3DSI2 was full               --)-)--)      (          (
 2ISI2 was ideal              ----)  ))    ((          (
 2DSI2 was rich               --)    ))-)  ((          (
 2DSI5 was situated           --)----)) )  ((----------(
 4ISI2 was conspicuous        --------) )  (           (
                                        )) (           (
 2DSI1 was a model            --)       ))-(-)         (
 2ISI1 was the highlight      --)-)-----)) ( )         (
 3DSI1 was a gift             ----)      ) ( )-)       (
 4ISI1 was the car            -----------) ( ) )       (
 4DSI1 was one item           --)          ( ) )       (
 3ISI1 was the entertainment  --)----------(-) )       (
                                           (   )       (
 2ISA2 was available          --)          (   )----)  (
 2DSA2 was sincere            --))         (   )    )  (
 4DSA2 was famous             ---)-)       (   )    )  (
 3DSA2 was uncomfortable      -----))      (   )    )  (
 3ISA2 was present            ------))-----(---)    )  (
 4ISA2 was responsible        -------)     (        )  (
                                           (        )) (
                                           (        )) (
 2ISA1 was the leader         --)          (        )) (
 2DSA1 was a friend           --)-)        (        )) (
 3DSA1 was high scorer        ----)-)      (        ))-(
 3ISA1 was the driver         ------)-)    (        ))
 4DSA1 was a student          --------))---(--------))
 4ISA1 was the speaker        ---------)   (         )
                                           (         )
 4DSI2 was relevant           --)          (         )
 4DSI5 was biased             --) ---------(---------)
                                           ()
 3ISI5 was suited             -------------()
                                            ))
 2DSA5 was devoted            --------------))
                                             ))
 4DSA3 was congratulated      ---------------))
                                              )
                                (-------------)
 2ISA5 was gathered           --(-------------)
                                (
                                (
                                (
                                (
                                (
```


2IPA2 were insistent
2IPA5 were tired
4IPA5 were renowned
2DPI5 were doomed
2DPA2 were ignorant
3DPA2 were aware
4DPA2 were proud
3IPA2 were behind
3IPA5 were addicted
2DPA5 were refined
2IPI2 were inferior
3IPI2 were grimy
4IPI2 were necessary
3IPI5 were related
4DPI2 were important
3IPI4 were included
2IPI5 were frayed
4IPI1 were a requirement
4DPI1 were a landmark
3DPI2 were graceful
3DPI5 were streamlined
2DPI2 were essential
3DPI1 were the cause
2DPI1 were the work

```
                                  (
                                  (
                                  (
                                  (
                                 ()
3DSA5 was accustomed        -)   ()
4DSA5 was endowed           -)-) ()
                               ) {)
3ISA5 was reputed           ---) (
                               ()
3IPI1 were the result       ---{)
                               ()
4IPA2 were present          ---{)
                               ()
2IPA4 were trampled         --- ()
                               ()
4DPI5 were deserted         ---{)
                               ()
4DPI4 were dismissed        --- ()
                             (--)
4DSI4 was approved          -{--)
                             (
                             (
2IPA1 were members          -{-)
4IPA1 were businessmen      -{-))--)
2DPA1 were the hostesses    -{--)  )
                            ((     ))
3DPA1 were experts          {{)    ))
4DPA1 were the heroes       {{)----))
                           (((------)
3IPA1 were a discredit     {{-------)
                           ((
2IPI3 were ignored         {(
                           (--)
2DSI3 was governed         {  )
                           (--)
3DPA5 were clothed         {--)
                           (
2IPI1 were a strain        {
```